SACRED, CULTURAL AND ECOLOGICAL CONSTRUCTS IN LANDSCAPE

AN INTEGRATED APPROACH_A CASE OF RENUKA LAKE, H.P

MASTER OF ARCHITECTURE (LANDSCAPE)

AKSHITA VASUDEV

2017MLA011

SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL

NEELBAD ROAD, BHAURI, BHOPAL – 462030

MAY 2019

1 INTRODUCTION

1.1 Background

Most people who are interested in religion study have little interest in geography study, and vice versa. The main reason is that some of the many interesting questions about how religion develops, spreads and impacts on people's lives are rooted in geographical factors (what happens where) and can be studied from a geographical perspective. (Park, 2004)

Space, location and location-where events are happening and that they are happening there. Religion's spatial patterns and distributions, and how these evolve over time. The real value of most geographic religious ideology studies is to describe spatial patterns, partly as they are often self-interesting, but also because patterns often suggest processes and causes.

Defining the two, Geography as "the study of space and place, and of movements between places". An American cultural geographer (Tuan, 1977) posed in his view, "the religious person is one who seeks coherence and meaning in his world, and a religious culture is one that has a clearly structured world view".

Religion, through culture and lifestyle, leaves an impression on the landscape. Many landscapes are represented by religious structures such as places of worship and other sacred sites. Religious traditions for example, Hindu ritual bathing in the Ganges leave their mark on an area's physical appearance. Religious observance affects believers time management, spatial movements, and behaviour. There are many possible themes that could be considered here given the many ways in which religion affects people and places.

A key question is "Why are some places regarded as sacred, and why is everywhere not regarded as sacred?". People are actively encouraged to visit sacred places in many religions, and this leads to pilgrimage. Moving large numbers of pilgrims to and within sacred sites is a special religious dynamic that can have major impacts on local economies and environments.

Due to observable religious features and rituals, the locations of most sanctified sites can be geographically analysed. In many cases, some rituals occur only at a specific sacred site, creating tremendous motivation for Believers ' journeys to that unique place. Thus, although the ritualistic movements within the confines of the sacred site occur on a scale not frequently studied by geographers, traveling to these religious nodes (i.e. pilgrimages) creates considerable geographical interest.

Sacred places and religious movement are inherently geographic in nature as landscapes are strongly identified by the geographical contexts of the place and the events that took place because of that kind of geography, which is the prime factor to impart identity to the landscape of that area.

1.1.1 The Geographical perspective of Landscape

It is well known that geography is subdivided into physical and human. Physical geography is concerned with the study of the character, processes and distribution of natural phenomena across the earth, whereas human geography is concerned with the study of characteristics directly related to humans and their activities or organization across the earth. (Clark, 1985)

In this respect, Guyot (1850) was already arguing that physical geography should be more than mere description. He thought it should be the science of the globe's general phenomena. As a result, the first generation of human geographers at the beginning of this century felt the need to change perspective; thus, they continued to explore the relationship between human activities and physical geography elements (e.g. climate, land forms, soil and vegetation) with greater emphasis. This way of thinking had a strong influence on new developments within the discipline, as it had previously tended to ignore human and environmental influences except when they were a factor in geomorphological and biogeographical change.

In this context, landscape studies have been divided into two main lines in this century: natural landscape, more physical geography-related, and cultural landscape, closer to human geography.

1.1.2 Protected Areas

Protected areas are vital to the conservation of biodiversity. They are the cornerstones of virtually all national and international conservation strategies, set aside for maintaining functioning natural ecosystems, acting as refuges for species, and maintaining ecological processes that are unable to survive in most intensely managed landscapes and oceans. Protected areas act as benchmarks against which human interaction with the natural world is understood. Today they are often the only hope we have of stopping the extinction of many endangered or endemic species. (Dudley, 2008)

Forests provide a variety of services to the environment. The recharge of mountain aquifers, which support our rivers, is the most important of these. They also preserve the soil, preventing flooding and drought. The forests provide wildlife habitat and ecological conditions for the preservation and natural evolution of flora and fauna genetic diversity.

1.1.2.1 Protected Landscapes and Cultural Landscapes

Protected landscapes and cultural landscapes share a lot of common ground: both focus on landscapes where their essential character is defined by human relationships with the natural environment over time. The primary emphasis is on the natural environment, conservation of biodiversity, and integrity of the ecosystem in protected landscapes. In contrast, the emphasis on human history, continuity of cultural traditions, and social values and aspirations in cultural landscapes has been given.

Nevertheless, despite the strong dualistic tradition, recent experience has shown that the natural and cultural heritage is inextricably linked in many landscapes and that more integration could benefit the conservation approach.

1.2 Approaches to Landscape Studies

"Landscape is about the relationship between people and place. It provides the setting for our day-to-day lives. The term does not mean just special or designated landscapes and it does not only apply to the countryside. Landscape can mean a small patch of urban wasteland as much as a mountain range and an urban park as much as an expanse of lowland plain. It results from the way that different components of our environment - both natural (the influences of geology, soils, climate, flora and fauna) and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) - interact together and are perceived by us." (Landscape Character Assessment: Guidance for England and Scotland (2002) Scottish Natural Heritage and The Countryside Agency).

Landscape refers to the visible characteristics of an area made up of physical elements such as landforms, water bodies and vegetation, human elements such as buildings and structures, and transitory elements such as lighting and weather. Landscape can generally be classified as natural and cultural.

1.2.1 Natural Landscapes

The natural landscape or landscape that existed before major human induced changes. These are referred to as the physical features of the land that we see which are the result of geology, climate and vegetation which have been acted upon by various factor within a course of time.

Thus, referring to landscapes which are in its purest forms and have not been disturbed by any of the human intervention in the zones are termed as natural landscapes, which have millions of variables in terms of landforms and other factors.

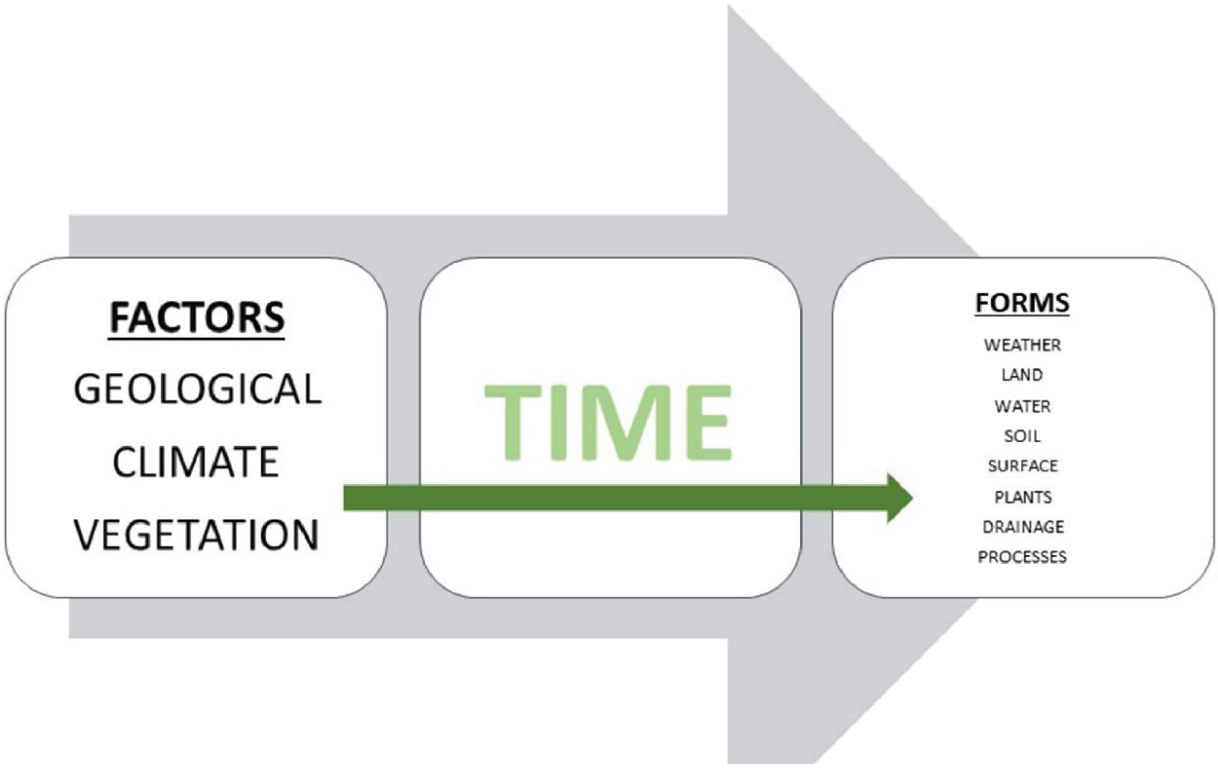


Figure 1: Phenomenon of formation of natural landscapes

1.2.1.1 Shiwalik Ranges

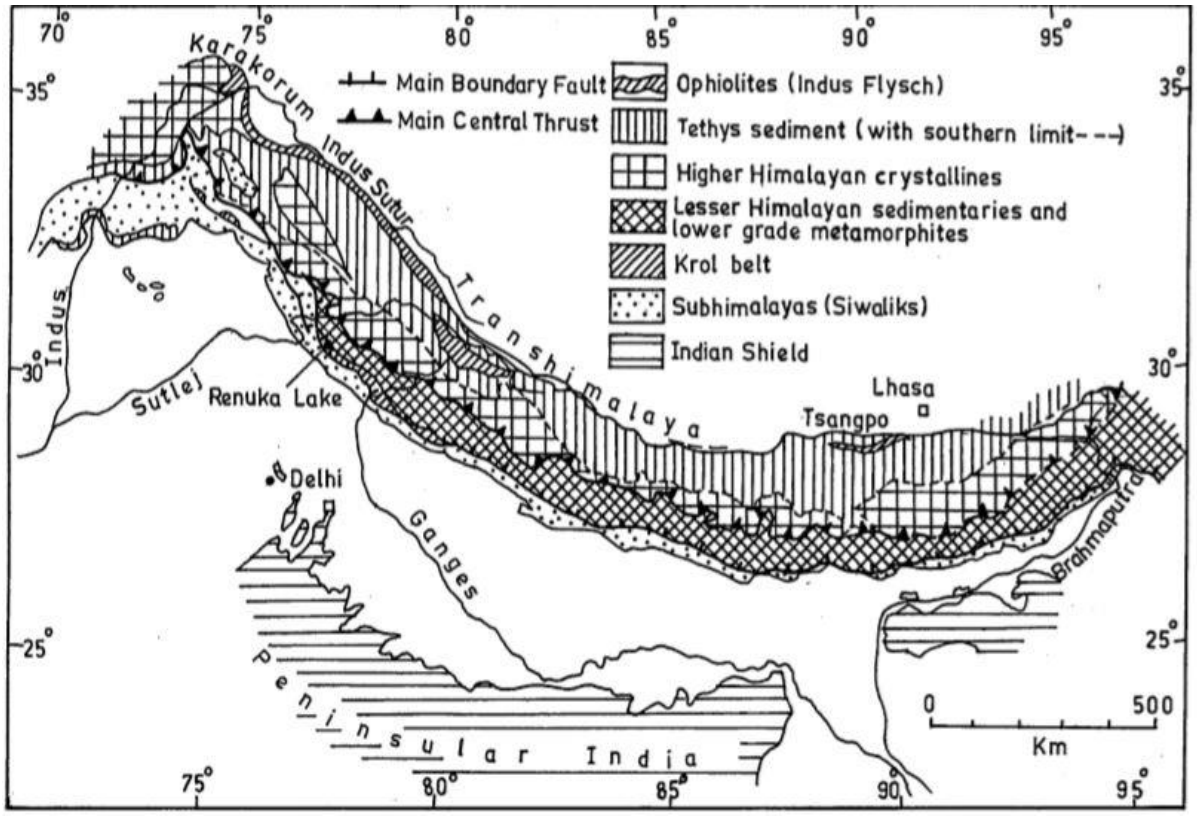
Himachal's name comes from the Himalayas. Himachal means' snowy mountain land.' Himalayas, the great mountain system extends nearly 2,500 km, from north-west to south-east, and the Himalayan width is between 250 and 300 km. One of the youngest in India's mountain system, the Himalayas are believed to be 40 million years old. The Himalayas are also the world's highest system of mountains.

Himachal Pradesh can be divided into three zones:

The outer Himalayas
The inner Himalayas
The greater Himalayas

Shiwalik Ranges fall into the outer Himalayan zone: this zone's altitude ranges from 350 meters (1050 feet) to 1500 meters (4500 feet) above sea level. This outer (lower) Himalayan range is well known as' Shivalik Hills ' (also known in ancient times as Manak Parbat). Shivalik means literally' Shiva's tresses.' It covers the lower Kangra, Hamirpur, Una, Bilaspur district hills and lower Mandi, Solan, and Sirmaur districts.

The famous sites in this area are Paonta Valley, Nahan tehsil, Pachhad and Renuka tehsils of Sirmaur districts, Balh Valley and Joginder nagar district of Mandi district, Kangra, Dharamshala, Palampur and Dehra district of Kangra district, Dalhousie, Bhattiyat, Churah and Chamba tehsil district of Chamba. The annual rainfall varies between 1500 mm and 1800 mm in this zone. This zone's climate and soil is suitable for the cultivation of maize, wheat, sugar cane, ginger, citrus and table potatoes.

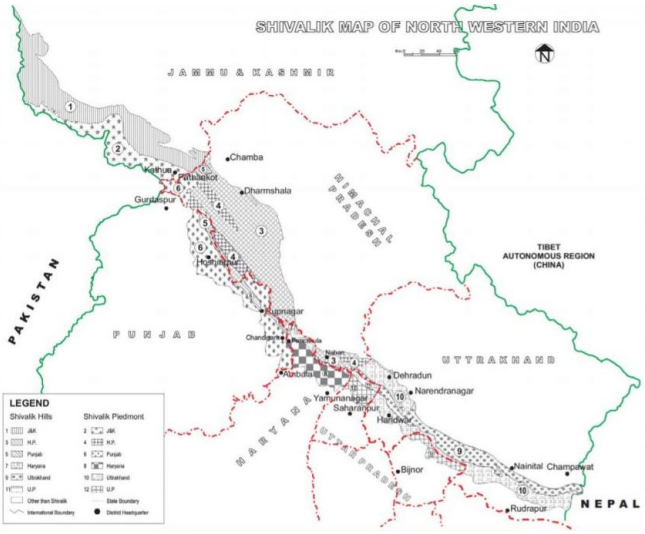


Map 1: Geology of Shivalik ranges

1.2.1.2 Shiwalik Region in North-western India

This Himalayan region is particularly sensitive to natural land disturbing activities. Steep slopes, high rainfall and weak geology of the Himalayas accentuate the land degradation and soil erosion process at much faster rate than in the plains due to fragile ecosystem (Das, 1986). Sediment starts accumulating on the river bed causing change of river course and flooding its bank.

Map 3: Map highlighting Shivalik ranges



Map 2: Shivaliks passing through North western India

The region comprises hills and piedmont plains in almost equal proportion. There is a large variation in area and distribution of Shivalik region in the north-western state the country. Kukal et al. (1991) and Sidhu et al. (2000).

Figure 2: Landscape character of the region

1.3 Cultural Landscapes

Human culture creates the cultural landscape or landscape. The term "cultural landscape" embraces a variety of manifestations of human-to-natural environment interaction.

Cultural landscapes often reflect specific techniques of sustainable land use, taking into account the characteristics and limitations of their natural environment and a specific spiritual relationship with nature.

Many cultures around the world attach sacred values to natural and cultural sites. Although different cultures interpret the word “sacred” differently, sacred places generally reveal strict behavioural restrictions, a sense of separateness (Hubert,1997), as well as strong emotion- oriented and place-bound characteristics (Levi&Kocher,2013).

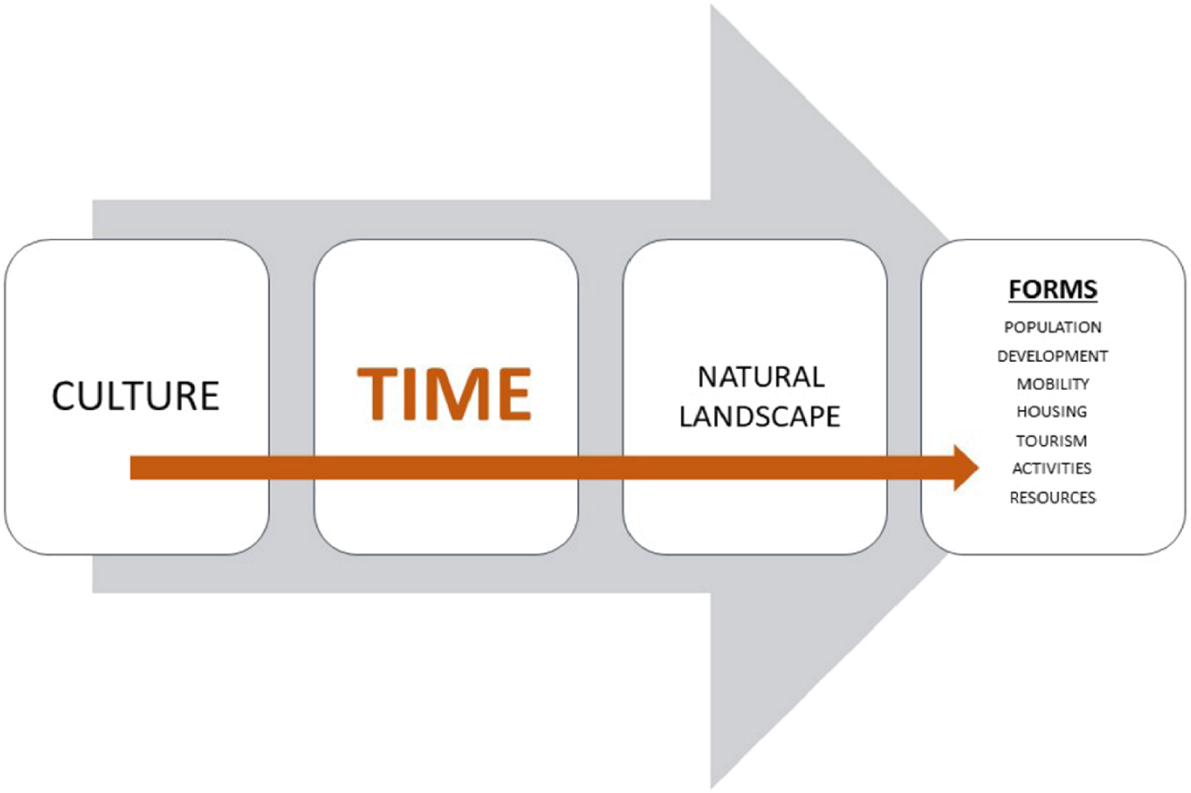


Figure 3: Cultural Landscape as a Phenomenon

1.3.1.1 Cultural Identity

The state's geographical spread, size and population is characterized by a process of gradual evolution, a unique historical and cultural complex in which indigenous religion and belief predominate. Himachal Pradesh, on the one hand, maintained ancient indigenous traditions and, on the other, adopted the highly developed cultural influence of the Indian Plains and the north-eastern cultural inflow. The hereditary and imported elements created an amalgam that gave Himachal its unique character.

Himachal Pradesh's hills and valleys are filled with beautiful lakes. Most of the lakes are sacred and thus play a significant role in the state's people's social and religious life. That worth mentioning is Sirmour Chander Nahan Lake of the Shimla Hills Renuka Lake, Mandi Lake of Prashar and Rewalsar, Kullu Lake of Bhrigu, Kangra Lakes of Dal and Lama, Chamba Lakes of Khajiar and Manimahesh. Govindsagar and some other lakes play an important role in the local population's economic life.

Some Vedic saints and sages came to the lower Himachal valleys as peaceful settlers in the later ages with their disciples and followers and established their hermitages in several places. Among them, the Renuka lake in the district of Sirmour is associated with Jamdagni, the Vashishtha Kund in the Kullu valley with Vashishtha Rishi, Nirmand with Parshurama, Bilaspur Beas cave with sage Vyas. The Puranas mention the people and places lying between the Chandrabhaga and the Yamuna extensively.

Hot springs that are found in Himachal Pradesh in many places are also connected with different legends and are therefore considered sacred places.

1.3.1.2 Fairs

Fair origin goes back to remote times. They are the institutions set up to centralize merchandise supply and demand at a specific location and time. They are considerable events in the life of the districts where they take place, because people from remote regions come there to buy and sell and visit the different side shows that accompany the fairs. In addition to their commercial importance, they have religious and traditional aspects and are not without their lighter side, people take compulsory leave from their daily routine, farming or otherwise, and decorate themselves with their best.

Sirmaur's Renuka fair is an important part of this Pradesh's series of cultural events. This colorful fair is celebrated on the bank of Renuka Lake for three days starting on the 11th day of the rising moon of Kartika (November 1st fortnight). Renuka, the wife of a Vedic sage Jamdagni and Parshu Rama's mother, is associated with this lake.

This account is again supported by a very strong local tradition according to which Jamadagni and his wife Renuka lived in the region of the old Sirmui State of Himachal Pradesh where a lake is still called Renuka in memory of Jamadagni's wife and is regarded as a place of pilgrimage by local Hindus. It is said that during his campaign against the rulers, he used to visit his mother on a particular day in the day of Kartika (October-November) on the 10th lunar night of the moon cycle. The people are still celebrating that day as a Renuka Fair.

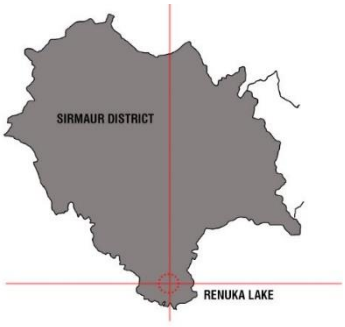
Figure 4: Renuka Temple during Fair

Figure 5: Cultural events during fair in mela ground

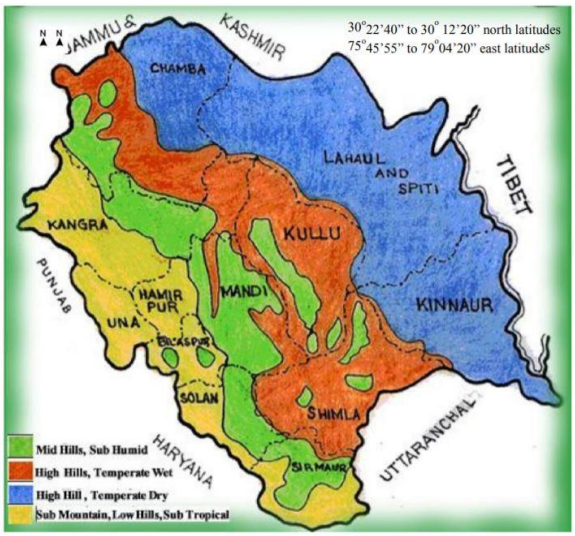
2 PROJECT AND SITE INTRODUCTION

2.1 Renuka Lake - An Overview

Renuka Lake is situated in an enchanting valley depression, about 20km northeast of Nahan, in Sirmaur district of Himachal Pradesh. The Renuka lake (30° 36' 30" Nahan 77° 27' 6" E, at an elevation of 640 msl) is situated in Sirmaur district of Himachal Pradesh, at a distance of about 155 km in south eastern side of Shimla.



Map 4: Map marking Sirmaur district



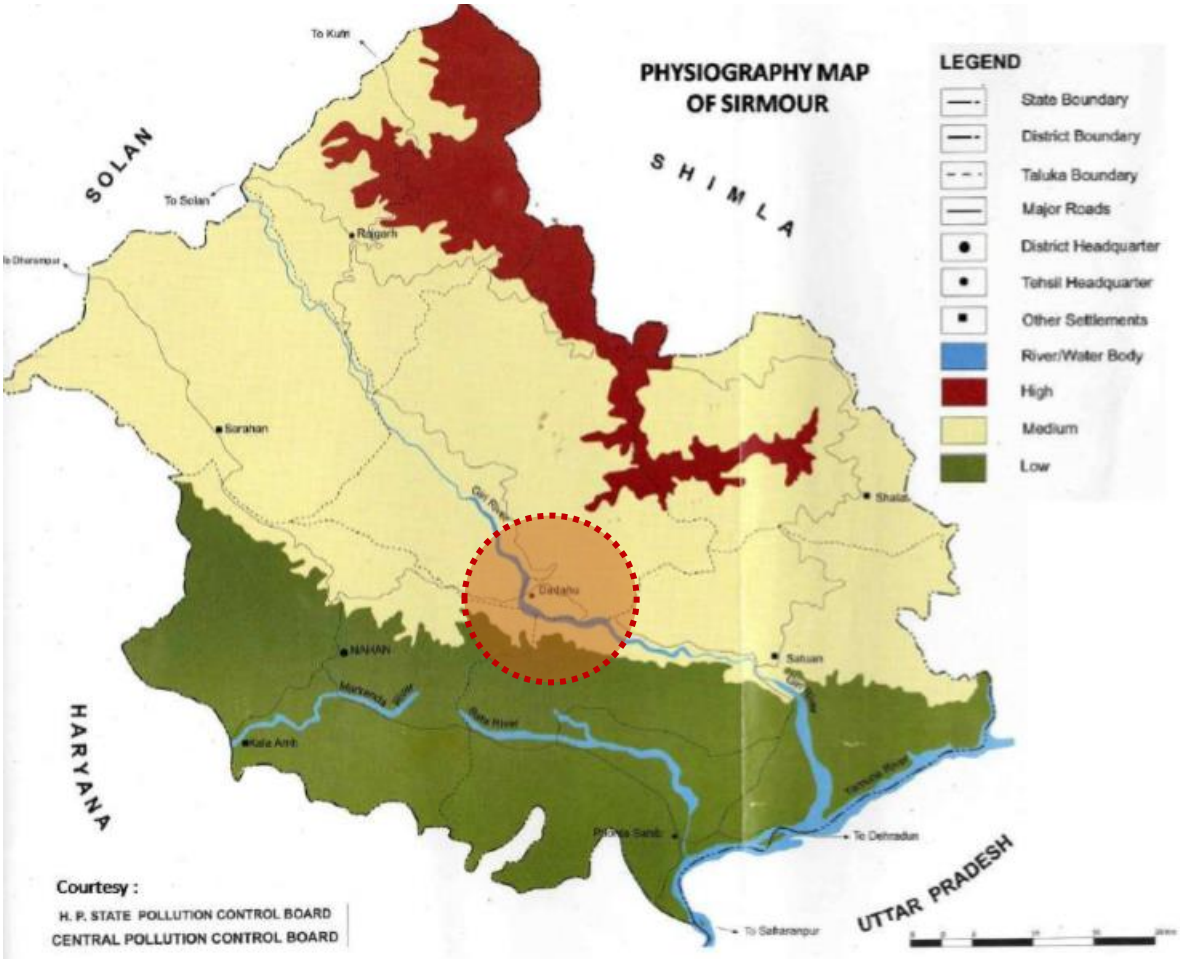
Map5: Map of Sirmaur marking hill zones

Sirmaur is Himachal Pradesh's southeastern district, forming a distinct Western Himalayan geographical pocket.

Lesser Himalayan zone (600m-3,630 m): between Shivalik and the great Himalayas lies this region. The area is structurally complex and rocks are predominantly sedimentary with abruptly rising peaks, otherwise with gentle slopes and famous for Chur-peaks and Shimla ridge.

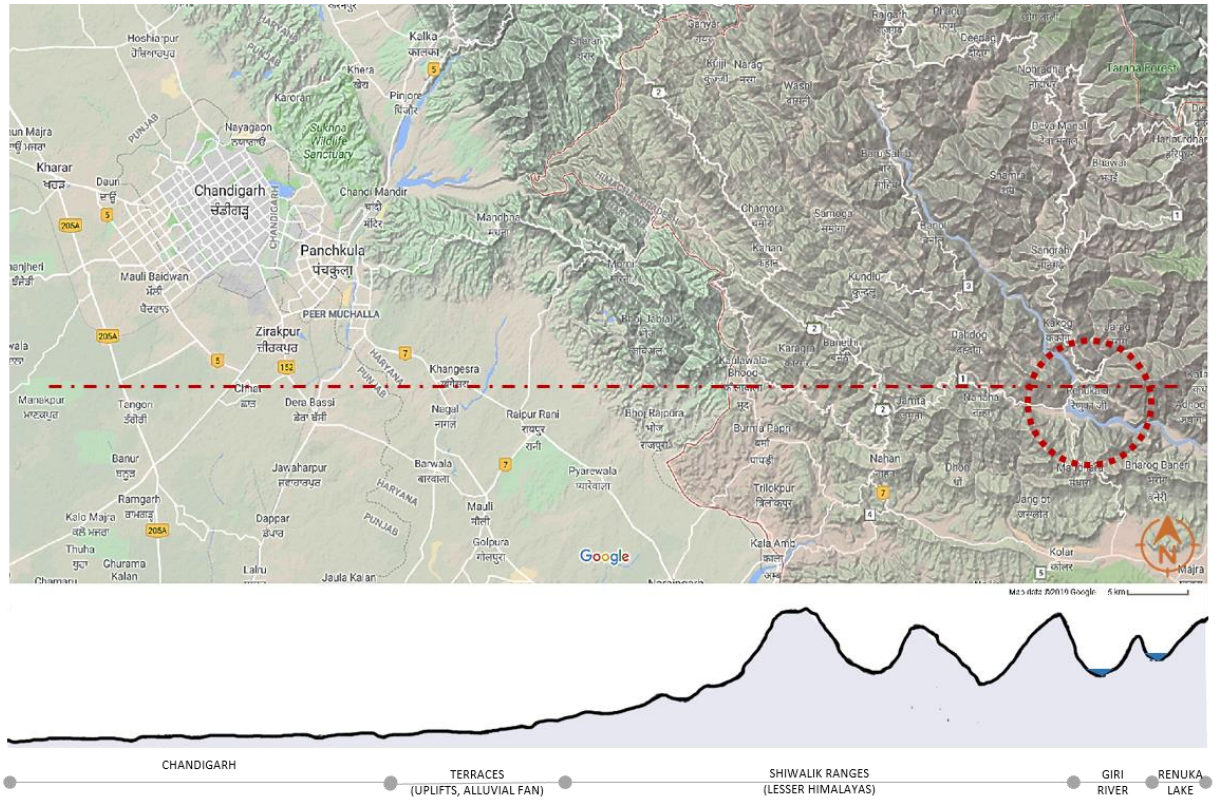
Mid-hill soil area (1,000-1,500): the soil is colored loam to clayey-loam and greyish-brown. This soil type is found in the lower part of Pachhad, Renuka, and Nahan in the northwest. The soils in reaction are neutral to slightly acidic, suitable for maize, wheat, potatoes, stone fruits, and fodder crops cultivation.

It is in the Lesser Himalayas with gradual elevation towards the ranges of Dhauladhar and Pir Panjal. The rise in the Shimla hills is faster, to the south of which is Churdhar Chandni's high peak (3647 m).



Map 6: Physiography of the region

Chopal and Rajgarh Forest Divisions border it on the north; Uttarakhand Chakrata Forest Division on the east; Nahan Forest Division on the west; and Paonta Sahib Forest Division on the south. The division's geographic area is 987 sq. km. And 549 square forest area. km. The division of Renuka, namely Renuka, Sangrah, Nohra, Shillai and Kafota, has five forest ranges. The whole tract is mountainous and ranges from 620 meters to 3647 meters above sea level. The whole Renuka Forest Division region falls within the Giri, Sainj and Tons rivers catchments.



Map 7: Topographic variation as we move from plain areas to ranges

The physiography of the region varies from 500m to 2100m as we move from Chandigarh to the lower Shivalik Himalayan region. The transition between the nearby places to ranges, forms terraces due to uplifts and formation of alluvial fan which is basically the foothills of this Himalayan region. As the rise starts from these foothills towards the Shivalik ranges there are series of hills and valleys which are formed out of which one such enchanting valley has Renuka lake situated in it.

The region is dominated by Mixed dry deciduous forests along with Shivalik Sal forest as we move towards the region, the altitude deciphers the typical vegetation type and these Himalayas being the youngest in origin have sedimentary rocks at the base, predominantly limestone, shale etc.

2.2 Why Renuka Wetland - A broader perspective

This place can be referred to as a Scenic Pilgrimage site thus offers different tourism aspects - Religious tourism, Eco-tourism and Adventure tourism.

The tourist from Uttarakhand (Dehradun side), Haryana and other cities such as Saharanpur, Ambala etc. intending to visit Shimla, passes through the city. The pilgrims are visiting the temple and lake of Shree Renukaji. Some tourists visit "Saketi Fossil Park" 22 km from Nahan City.

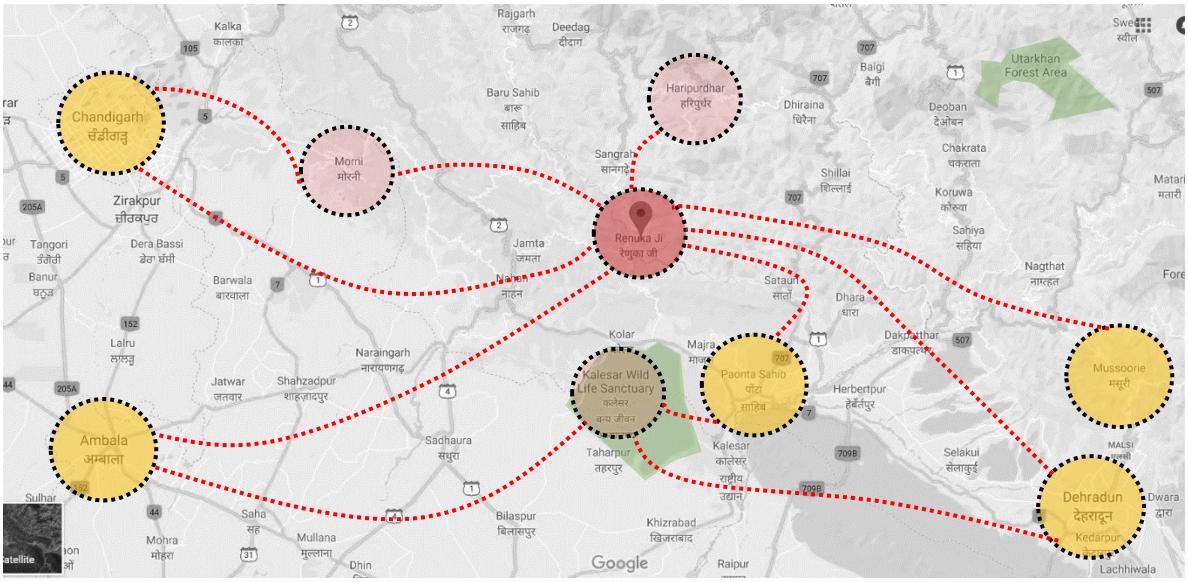


Figure 6: Cities adjoining Renuka Ji

2.2.1 Type of People and Tourism that the Place Caters

The place being a Scenic pilgrimage site invites people from different areas as well as fields. The stakeholders can be divided into 3 broad categories: Pilgrims, Tourists and Educationists.

TYPE OF PEOPLE THAT THE PLACE INVITES

Pilgrims

Sage

Tourists

Bag Packers

Botanists

Geographers

The variety of stakeholders and the geographical location of the site opens up opportunities of various kind of tourism that the site can cater to. Some of them are listed below, this taken into consideration with an integrated and sustainable approach makes the place important for preservation.

TYPE OF TOURISM THAT THE PLACE OFFERS

2.2.2 Tourist Circuits

The place falls into the regional tourist circuit out of all these, Renuka Wetland is a combination of natural as well as cultural landscape, thus is preferred by major part of the tourists.

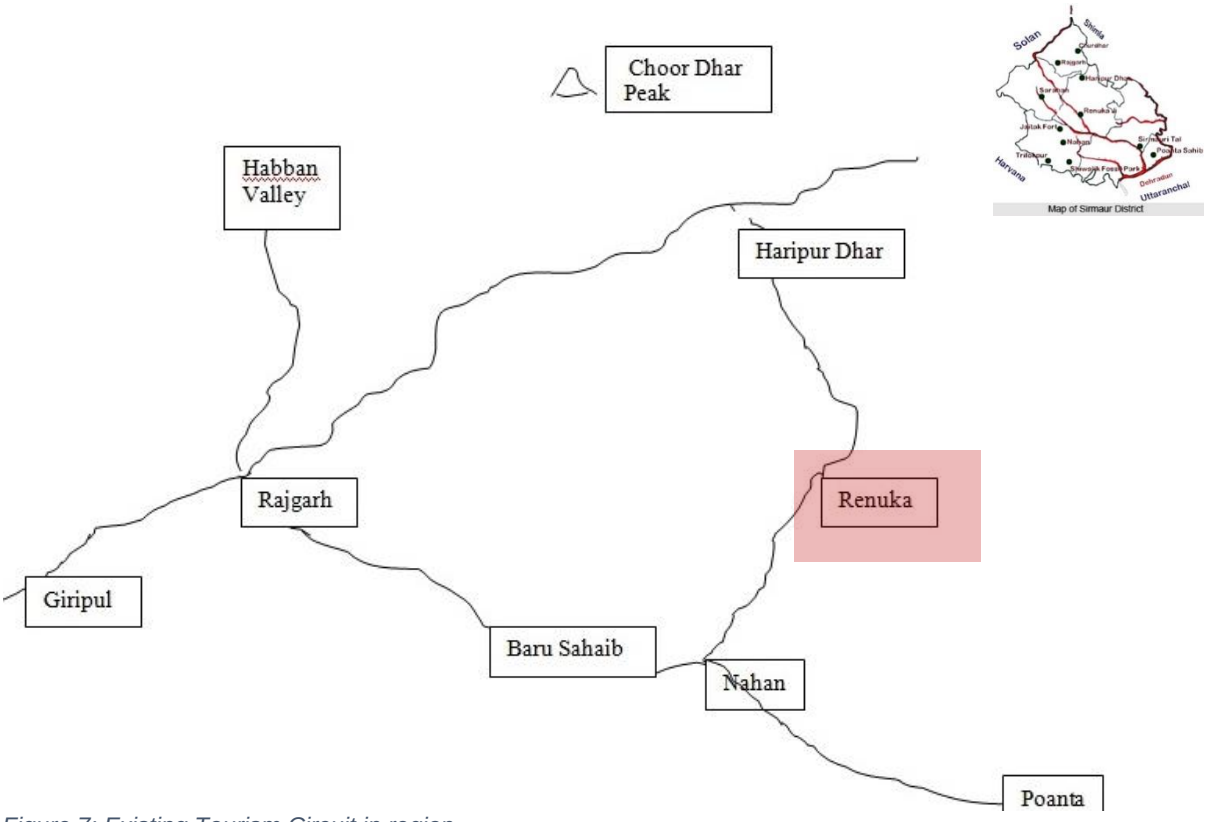


Figure 7: Existing Tourism Circuit in region

2.2.3 The Sacred Component

The landscape of Renuka ji has evolved itself in a very symbolic manner, each component has a mythical notion attached to it which narrates a historic event and has a sacred significance attached to it.

These symbolic markers were given physical manifestations which are now considered as sacred and invites the pilgrims to this site.

Figure 8: Sacred components

The sacredness of the place can be can be felt by both tangible and intangible elements comprising the space, daily chores of the day, the patterns of rituals that follow each day, the sacred water and the natural features all around the place.

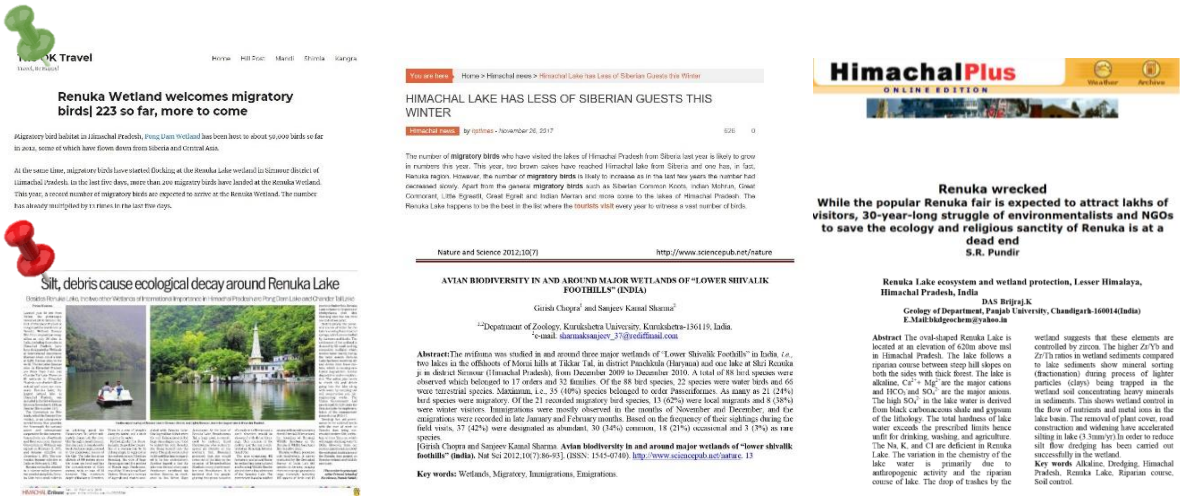
The activities that take place daily or on annual basis narrate the sacredness of place. People come from Jamu Koti village with a palanquin once in a year and a six-day fair is held at that time with thousands of devotees from all over the place.

Some strategic locations with have their relevance with the past are considered as sacred markers of the place where the concentration of pilgrims is higher as compared to other spaces within the zone.

2.2.4 The Ecological Component

The Renuka Lake was included in India's list of Ramsar sites of international importance under the Ramsar Convention's declaration on wetlands during 2005. A natural wetland fed by a small stream flowing from the lower Himalayan to the Giri River with freshwater springs and inland subterranean karst formations. The lake has at least 443 fauna species and 19 flora species.

Figure 9: Biodiversity of Renuka Lake



Renuka Wetland welcomes migratory birds| 223 so far, more to come

Silt, debris cause ecological decay around Renuka Lake

HIMACHAL LAKE HAS LESS OF SIBERIAN GUESTS THIS WINTER

AVIAN BIODIVERSITY IN AND AROUND MAJOR WETLANDS OF "LOWER SHIVALIK FOOTHILLS" (INDIA)

HimachalPlus ONLINE EDITION

Renuka wrecked

While the popular Renuka fair is expected to attract lakhs of visitors, 30-year-long struggle of environmentalists and NGOs to save the ecology and religious sanctity of Renuka is at a dead end

S.R. Pundir

Figure 10: Articles showing environmental concerns

2.3 Narratives of the Place

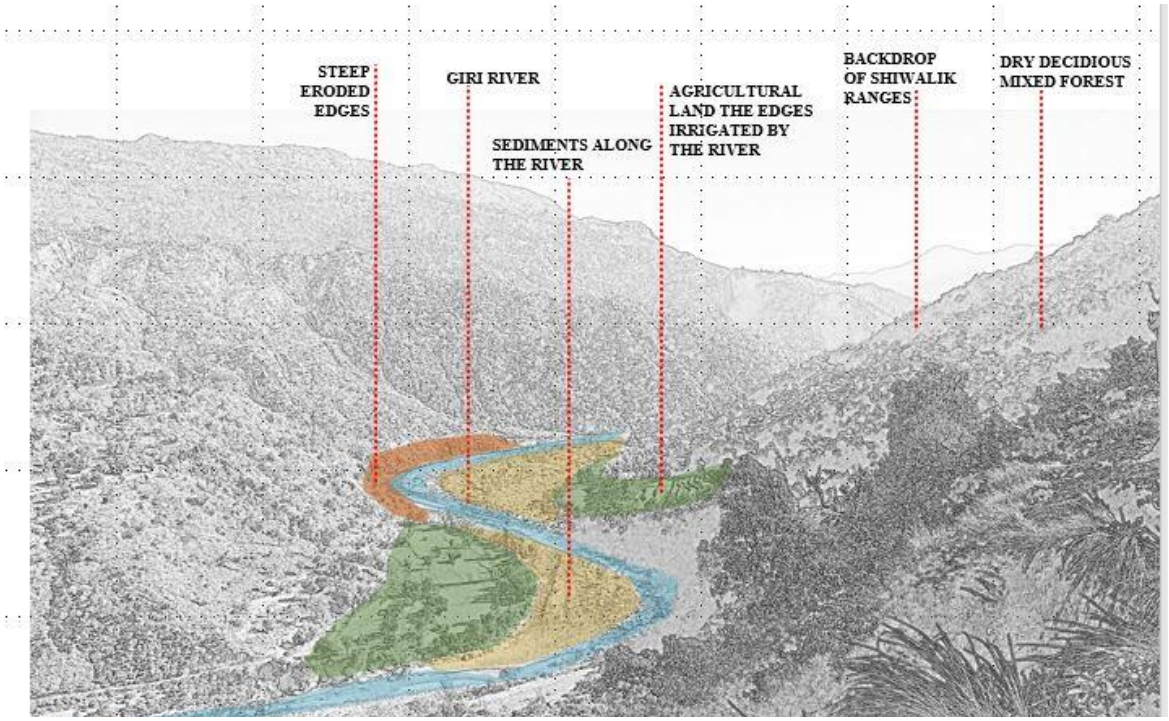


Figure 11: Area along Giri River

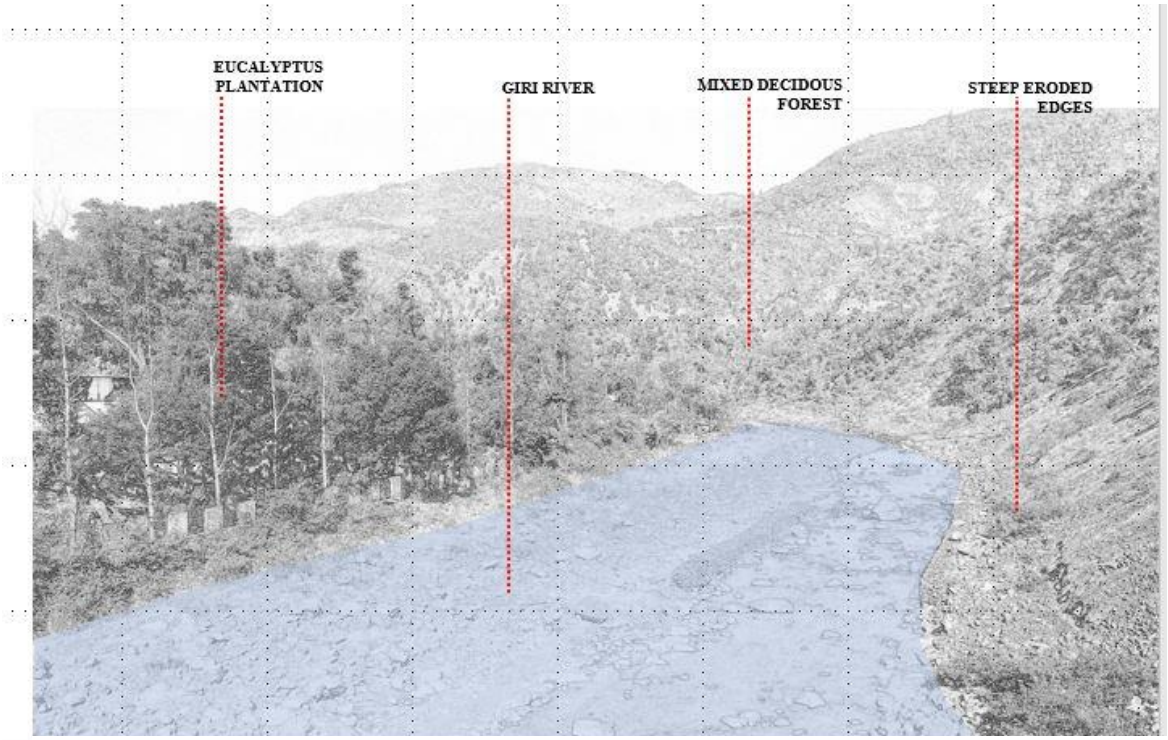


Figure 12: Erosion along the river

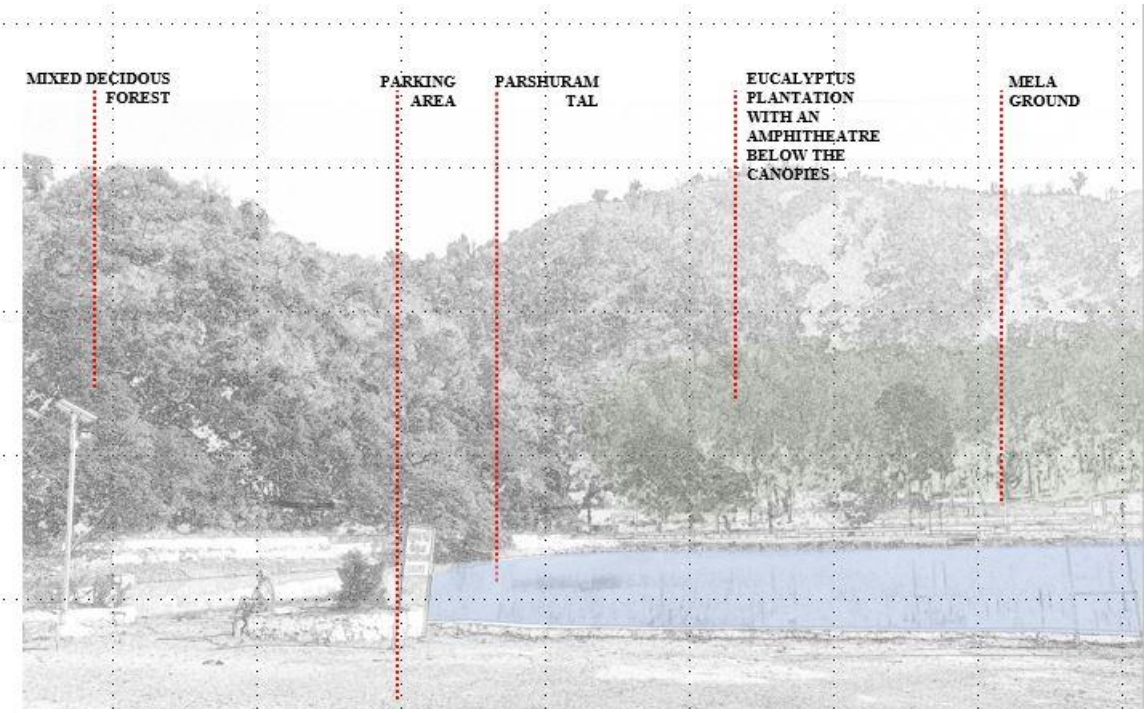


Figure 13: Parshuram Tal

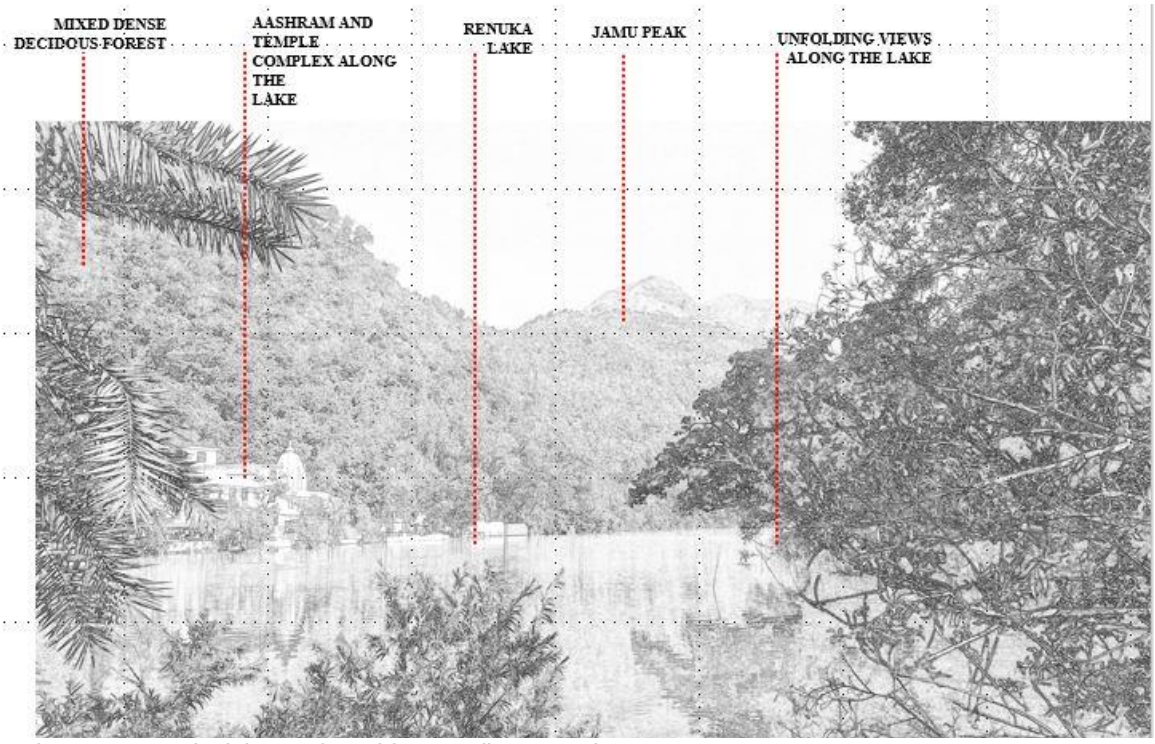
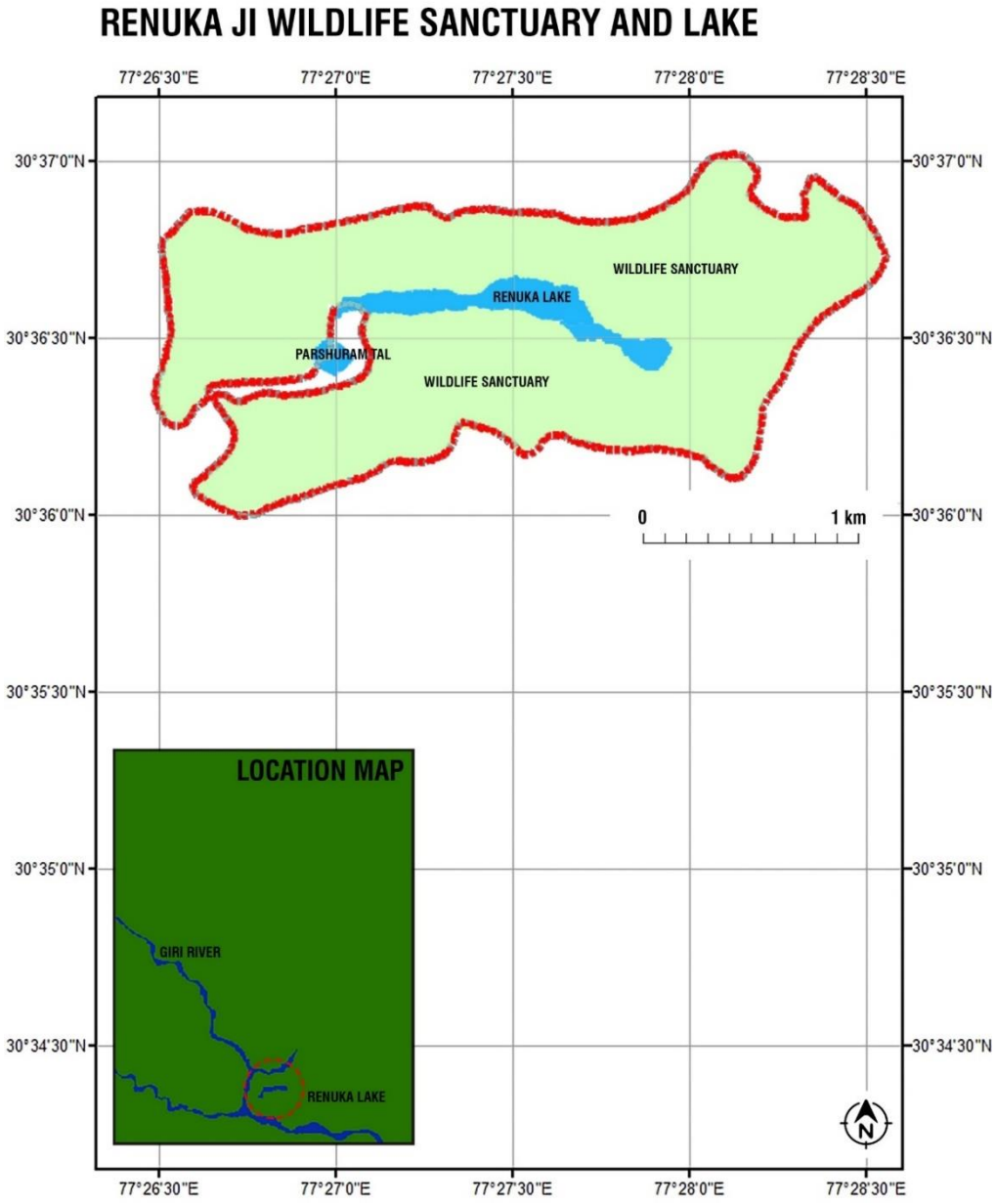


Figure 14: Renuka lake as viewed from Parikrama path

The Renuka Wildlife Sanctuary is located in the Himachal Pradesh district of Sirmaur. Dadahu Sanctuary's nearest town is about 2 kms away. The Sanctuary is well connected by the road network from Renuka Ji. The sanctuary's total area is 402,80 hectares. The entire Renuka Wildlife Sanctuary consists of only Renuka Reserve Forest and has been declared as "Abhayaranya" with no rights in this area recognized.



The typical dumbbell shaped lake of Renuka is about five times longer than its width. It is divided by a constriction in the middle into eastern and western basins. There is an inlet near the eastern basin, Shatradhara, while its outlet is on the western side adjacent to the Parsuramtal. There is emerging and free floating macrophytic vegetation in the two shallow zones on the eastern and western sides of the lake.

2.4 Contextual Background

A Place or landscape associated with an age old and deeply rooted mythical notion is very much ‘locative’ and ‘archetypal’ in nature. Locative here can be understood in a way, that for example, its traditions, cultures and rituals that are primarily linked to a specific place like hill tops, rivers, groves, forests etc.

“In the wider Hindu traditions these places, particularly those associated with water are often called ‘Tirthas’, and pilgrimage to these tirthas is one of the oldest and still one of the most prominent features of Indian religious life” (Eck, India's "Tīrthas": "Crossings" in sacred geography, 1981).

Looking at the origins of religions, it was very eminent that the landscapes shaped by the gods and goddesses grew with a specific set of cultures and religion as we see today, which can now be called scared geographies. These geographies have several meanings for indigenous cultures (Wishart, 2004) and are repositories of knowledge, beliefs, values, inherent meanings, hierarchies, religions, notions of time, stories.

These places are revealed by society’s mythology thereby becoming the physical manifestations of the mythological system (Wishart, 2004). Preserving these landscapes at a present-day scenario is a major concern, not just reviving the past in present generations but also to preserve it as an ecological entity with a very sustainable approach.

Renuka Lake, which shares its existence with an age-old legend of Bhagwati Renuka Ji the mother of Lord Parshuram, the sixth incarnation of Vishnu. A hill top in the proximity of lake, which is known as Tape ka Tila is linked to this legend of Maharishi Jamdagni and his wife Bhagwati Renuka ji who meditated on the, hillock, for many years together and were blessed with Lord Parshuram the sixth incarnation of Vishnu by Lord Shiva. A mythical notion has its roots behind the formation of lake which is named after Renuka ji, which was earlier known as Ram Sarovar. It is regarded as embodiment of Renuka ji, as she jumped into the water to escape from Sahastrabahu, kshatriya warrior, who intended to abduct her after killing her husband. This lake is in the shape of a woman, and is considered to be a great symbol of sacred beliefs as the lake symbolizes her body parts and there are different temples located at those places, thus acts as a strong marker for such sacred geographies.

This place has adorned itself with biodiversity and indigenous cultures. It has become symbolic to eco – cultural importance due to which it invites numerous tourists from all over the country. “Eco-tourists eschew large crowds who travel to national and/or foreign destinations in search of nature, but as with cultural travel, this does not always mean that eco-tourism is sustainable”. The focus of much of the social scientific literature on tourism sees it as the big bad wolf of the modern era.

Anthropogenic along with environmental factors of the place are responsible for the constant shrinking of the lake and impact of tourism on the nature reserve areas around the lake. This has created an imbalance between the two aspects of the place. It is also very difficult to ignore the sudden and massive changes that such factors are imposing on the existing ecological and cultural landscapes of the place. This situation evokes us to think upon the cultural aspect of ecology so that a sustainable approach for the same can be derived to revive such places of importance.

2.4.1 Cultural and Ecological Aspect

The Renuka Lake and its surroundings have presently evolved itself in a very symbolic manner. This symbolism can be derived from various places in and around the place that depicts an age story related to it. These have become the markers of cultural relevance which lures the tourist to this place.

Every year, a state-level fair is organized in which thousands of devotees visit the site, this fair lasts a week and the beginning of which also marks Lord Parshuram's divine meeting with his mother Renuka ji. The lake banks look festive as local crafts shops, food kiosks and art displays dot the path. This evokes other nuances of caste system and feminism as the regional construct of these landscapes; thus, it is very relevant to evoke such notions of time in present era through reviving the inherent meanings of these spaces and converting them into places of importance.

Besides this, Renuka Lake is also known for its rich biodiversity as it was declared on 8.11.2005 as a Ramsar Wetland site, which is home to numerous species of plants, animals and Avi-fauna. It therefore considers that it is of great ecological importance. Together with its rich culture, this ecological place promotes tourism to the place that, in turn, raises concerns about preserving the ecological entity that incorporates cultural factors.

Studying this is useful in preserving culture and promoting sustainable tourism practices because the environmentalists pose the concern of the slowly shrinking lake. It will continue to delight tourists and attract migratory birds from as far as Siberia as long as the lake remains untouched by commercialization.

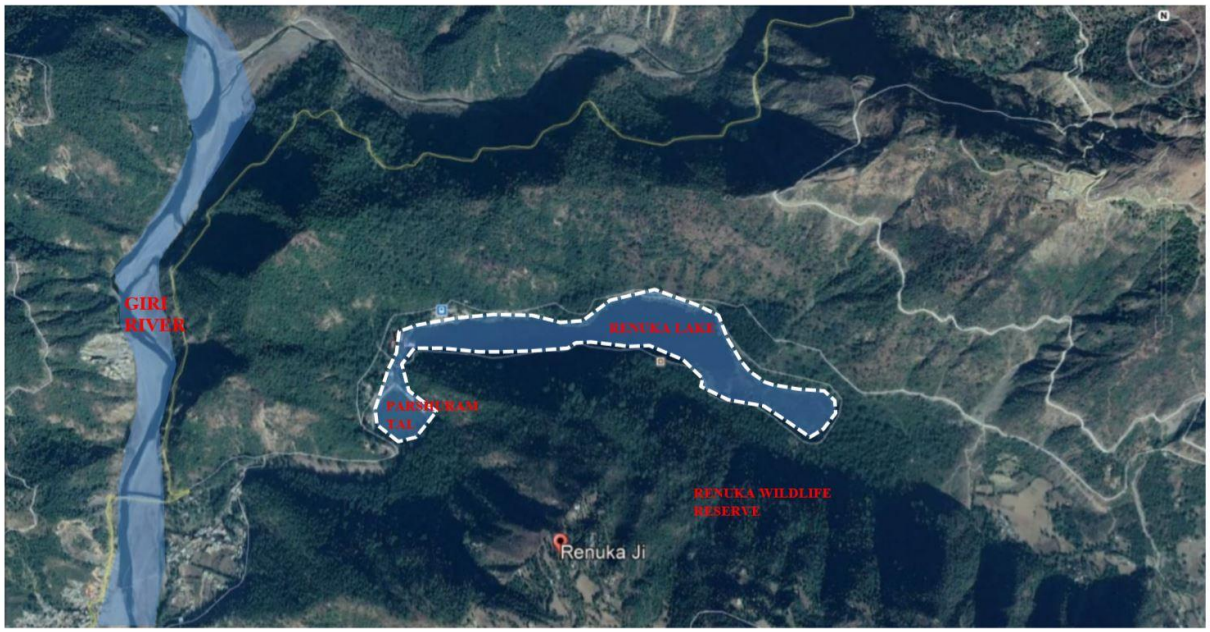


Figure 15: Renuka lake context

One of such sacred geographies include Renuka Lake which is situated in an enchanting valley depression, about 20km northeast of Nahan, in Sirmaur district of Himachal Pradesh.

This area is recognized by its religious, aesthetic and cultural value. This place is ecologically, culturally and mythologically rich, as the constructs of these landscapes are the result of convergence of these aspects. This place has adorned itself with biodiversity and indigenous cultures.

Figure 16: Sacred geography of Renuka lake

This symbolism can be derived from various places in and around the place that depicts an age-old story related to it. These have become the markers of cultural and ecological relevance. With the increase in intervention of human activities in the name of development this place has started losing its identity in terms of its historical as well as natural aspects. Also, the boom in the tourism industry at this place, with no strategies to cater them is leading to constant deuteration of lake and its environs on a constant rate.

SYMOLISM AND CULTURAL MARKERS OF THE PLACE

Renuka Lake is also known for its rich biodiversity as it is declared as Ramsar Wetland site on 8.11.2005, which inhabitats numerous species of plants, animals and Avi-fauna. Thus, holds to be of a great ecological importance.

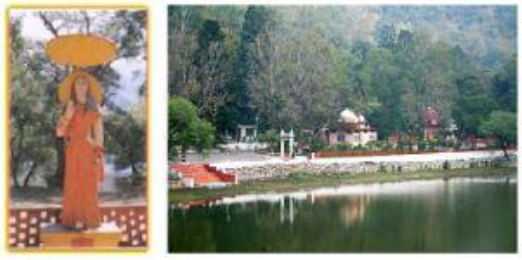
BIODIVERSITY OF THE WETLANDS

2.5 Timeline and Background Processes

2.5.1 Mythological history-Making of Temple in 19th century

2.5.1.1 The Legend

According to the legend, when the evil Sahasarjuna killed the sage Jamadagini and tried to abduct his wife Renuka, she flowed into these waters. The gods have revived her, and this lake is considered her embodiment.



2.5.1.2 Embodiment of Renuka Ji

The Renuka Lake (672 m) is considered to be Renukaji's embodiment, the sage Jamadagini's wife, and Parshurama's mother — one of Lord Vishnu's ten ' Avatars. ' The lake has a circumference of 3.5 km and is the largest in Himachal, shaped like a woman's profile.

2.5.1.3 Parshuram Tal and Temple Complex

This large pool is considered to embrace Lord Parshurama at the base of the Renuka lake, who wanted to spend all eternity at the feet of his mother. Renukaji's original temple is here, reportedly built overnight by an invading force of Gurkhas in the early 19th century.

2.5.2 Wildlife Sanctuary/Reserve Forest

2.5.2.1 1957-Wls & 1983-Mini Zoo

The Sanctuary of Renuka Wildlife is located in Sirmaur's Himachal Pradesh district. The nearest town of Dadahu Sanctuary is about 2 km away. Renuka Ji's road network connects the sanctuary well. The total area of the sanctuary is 402,80 hectares. The entire Renuka Wildlife Sanctuary is made up of Renuka Reserve Forest alone and has been declared as "Abhayaranya" with no rights recognized in this area. Furthermore, a buffer belt has been declared a 300-hectare area outside the sanctuary but adjacent to its boundary.

Figure 17: Wildlife sanctuary of Renuka Forest Division

2.5.3 Declaration as Ramsar Wetland Site

2.5.3.1 8TH November 2005

The Renuka Lake was included in the 2005 declaration of the Ramsar Convention on Wetlands in India's list of Ramsar sites of international importance. A natural wetland fed by a small stream that flows from the lower Himalayan to the Giri River with freshwater springs and karst formations inland. There are at least 443 species of fauna and 19 species of flora in the lake.

2.5.4 Environmental and Tourism Issues

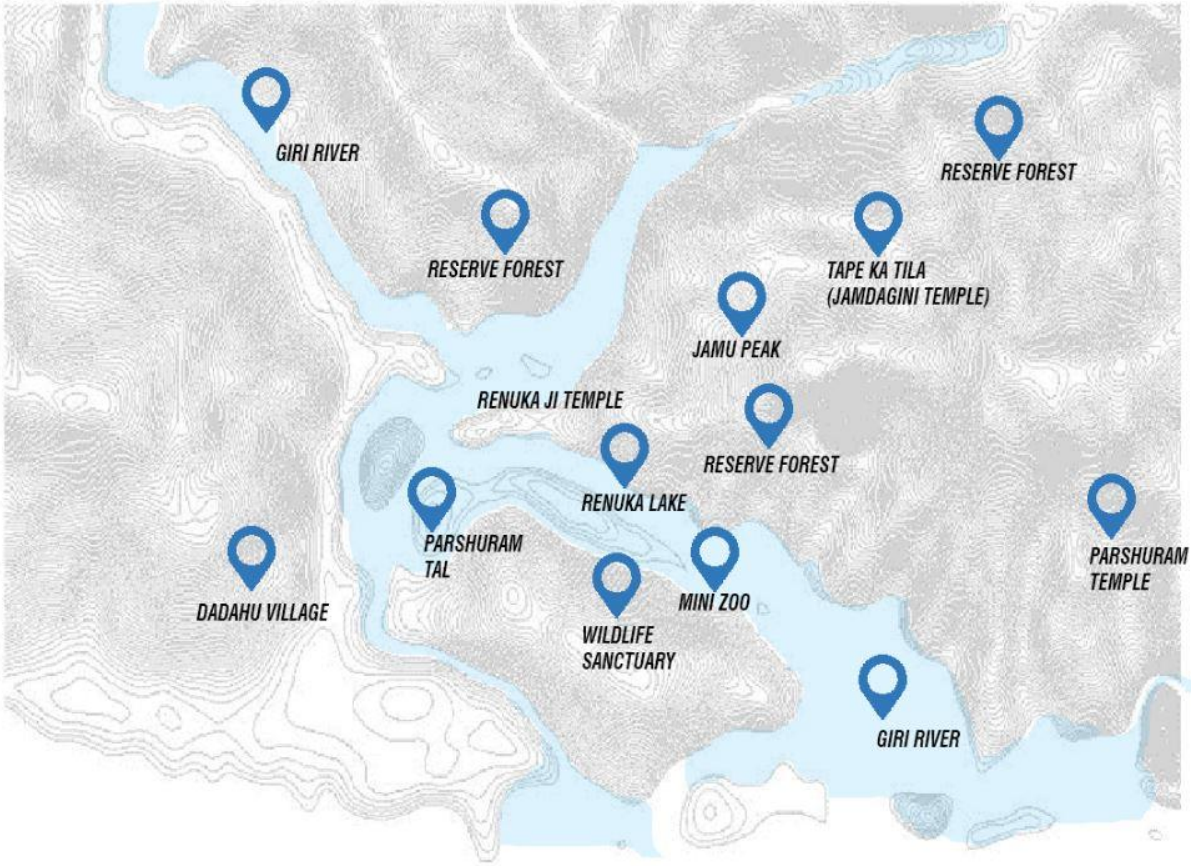
2.5.4.1 Main Issues

- DEGRADATION OF WETLAND
- REDUCTION IN NUMBER OF MIGRATORY BIRDS
- SILTATION IS AFFECTING THE AQUATIC LIFE OF THE LAKE
- PRESSURE OF TORISM DEVELOPMENT ON THE WETLANDS

2.6 Evaluating Landscape and Sacredness of Renuka Ji And Its Surroundings

Over an approx. area. 35-40 square kilometers of a cohesive landscape marked by places that encompass both natural and human-built features that echo the duality of the area as a religious ideology as well as a narrative of nature, making it a PLACE OF THE PAST that has a significant character to retain in the pursuit of these aspects. The landscape's cohesiveness is found not only in the symbolism of certain areas, but

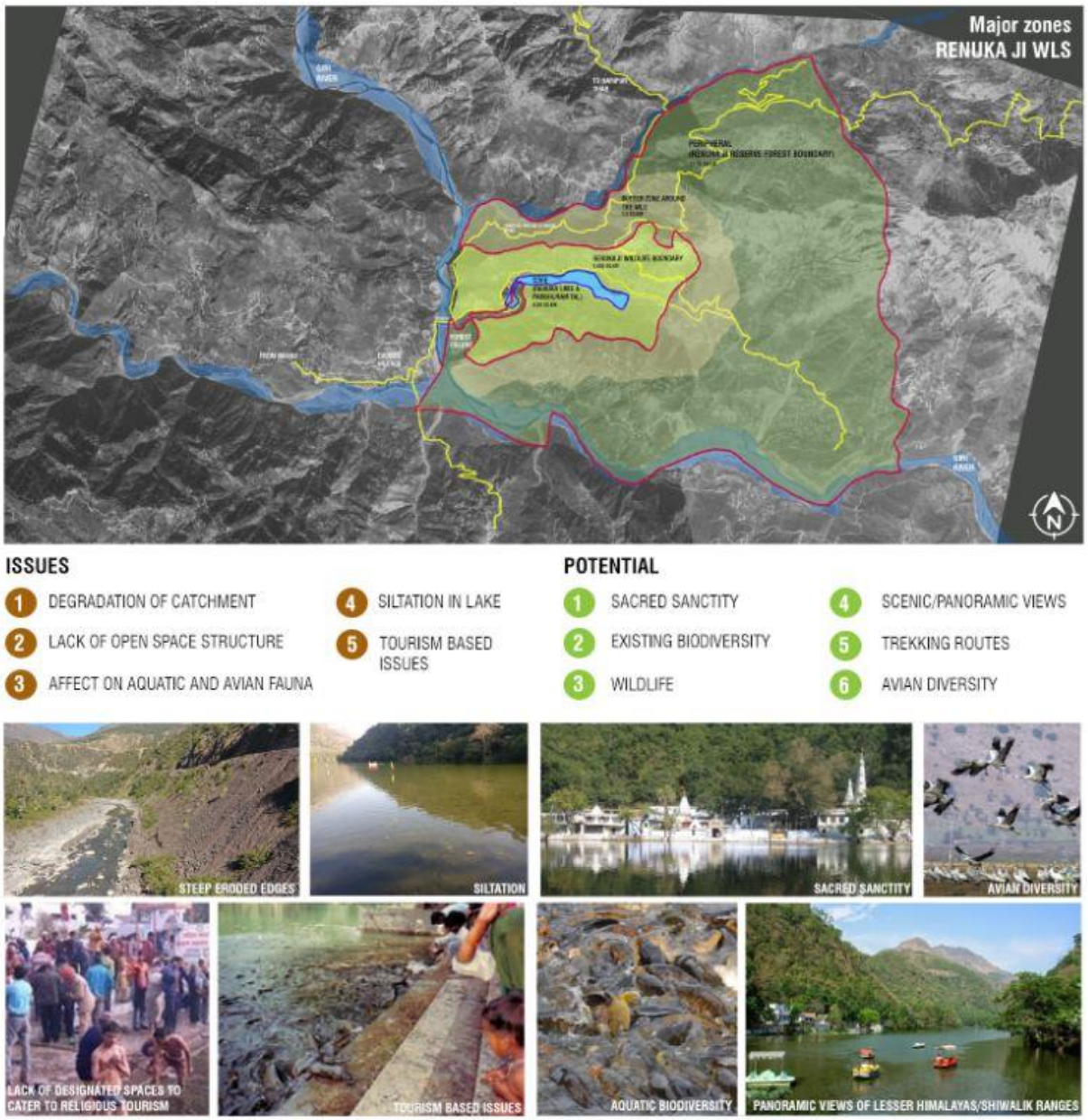
also in the inherent meanings these places narrate, either through the natural features or through the human interventions in landscape.



Map 8: Sacred markers in the region

2.7 Renuka Lake – Current Scenario

Presently, there are certain issues relating to the environmental concerns, and human induced which are identified. Also, this place has a lot of potential inherited for the local populace and the tourists which either come here for religious purposes or to get a refuge from the city life.



Map 9:Major zones in wetland

2.8 Need and Relevance of the Project

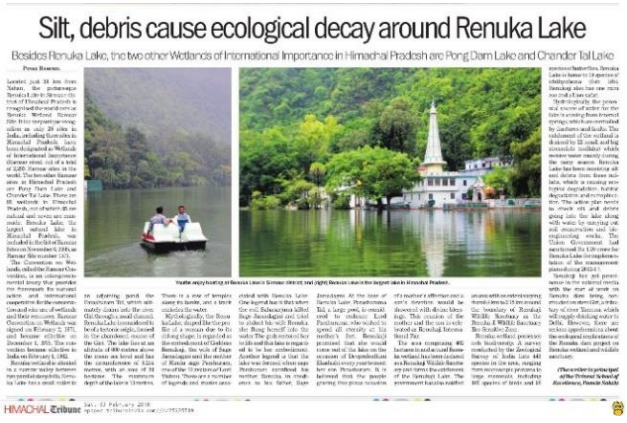
The study on Renuka Lake is significant for two reasons: Firstly, to understand the mythical notions of the regional construct and to revive the notions of past, through

landscapes and secondly, to preserve the existing biodiversity of the wetlands which is a host to numerous species.

The Renuka Lake has been recognized by the National Wetland Management Committee as one of the Himachal Pradesh's major wetlands for priority conservation and management (State Council for Science, Technology & Environment, HP Govt.). Reddy & Char, (2004) also recommended that this lake be protected and restored. The Renuka Lake was included in India's list of Ramsar sites of international importance under the Ramsar Convention's declaration on wetlands during 2005.

It is an important religious lake of Himachal Pradesh. A state-level fair is held every year at Renuka Lake where thousands of devotees visit the lake for holy bath and worship at the site temples.

Different factors such as natural and manmade disturb the lake ecosystem. Climate, acid rain, nuclear failure, land slide, etc. may be the natural factors. But the impact of manmade factors is pronounced and detrimental in most fresh water lakes. Discharge of pollutants from point and non-point sources, deforestation, extensive cultivation, construction of buildings, road construction and widening, establishment of industries, discharge of untreated effluents, domestic sewage etc. not only pollutes the water body but also causes increased silt flow in the lake basin making it shallow and thus shortening the lake's life span.(Brijraj.K, 2016)



Silt, debris cause ecological decay around Renuka Lake

Besides Renuka Lake, the two other Wetlands of International Importance in Himachal Pradesh are Pong Dam Lake and Chander Tal Lake

HIMACHAL Tribune

Renuka Lake ecosystem and wetland protection, Lesser Himalaya, Himachal Pradesh, India

DAS Brijraj.K
Geology of Department, Panjab University, Chandigarh-160014(India)
E.Mail:bkdgeochem@yahoo.in

Abstract The oval-shaped Renuka Lake is located at an elevation of 620m above msl in Himachal Pradesh. The lake follows a riparian course between steep hill slopes on both the sides with thick forest. The lake is alkaline. Ca^{2+}+ $Mg^{2+}$are the major cations and $HCO_3^-$and SO_4^{2-} are the major anions. The high SO_4^{2-} in the lake water is derived from black carbonaceous shale and gypsum of the lithology. The total hardness of lake water exceeds the prescribed limits hence unfit for drinking, washing, and agriculture. The Na, K, and Cl are deficient in Renuka Lake. The variation in the chemistry of the lake water is primarily due to anthropogenic activity and the riparian course of lake. The drop of trashes by the wetland suggests that these elements are controlled by zircon. The higher Zr/Yb and Zr/Th ratios in wetland sediments compared to lake sediments show mineral sorting (fractionation) during process of lighter particles (clays) being trapped in the wetland soil concentrating heavy minerals in sediments. This shows wetland control in the flow of nutrients and metal ions in the lake basin. The removal of plant cover, road construction and widening have accelerated silting in lake (3.3mm/yr).In order to reduce silt flow dredging has been carried out successfully in the wetland.

Key words Alkaline, Dredging, Himachal Pradesh, Renuka Lake, Riparian course, Soil control.

Figure 17: Article stating the environmental issues in lake

2.8.1 Issues and concerns

Anthropogenic along with ***environmental factors*** of the place are responsible for the constant ***shrinking of the lake*** and impact of ***tourism*** on the nature reserve areas around the lake. This has created an ***imbalance*** between the two aspects of the place.

It is also very difficult to ignore the sudden and ***massive changes*** that such factors are imposing on the ***existing ecological*** and ***cultural landscapes*** of the place. The ***lake ecosystem is disturbed*** by various factors such as natural and manmade.

2.9 Vision

The project aspires to have an integrated approach towards the constructs of this landscape with series of open spaces which evokes and enhances the notion of sacredness and develop a strong connection of human towards nature, which would help weave the lost spaces to regain its identity.

2.10 Aim

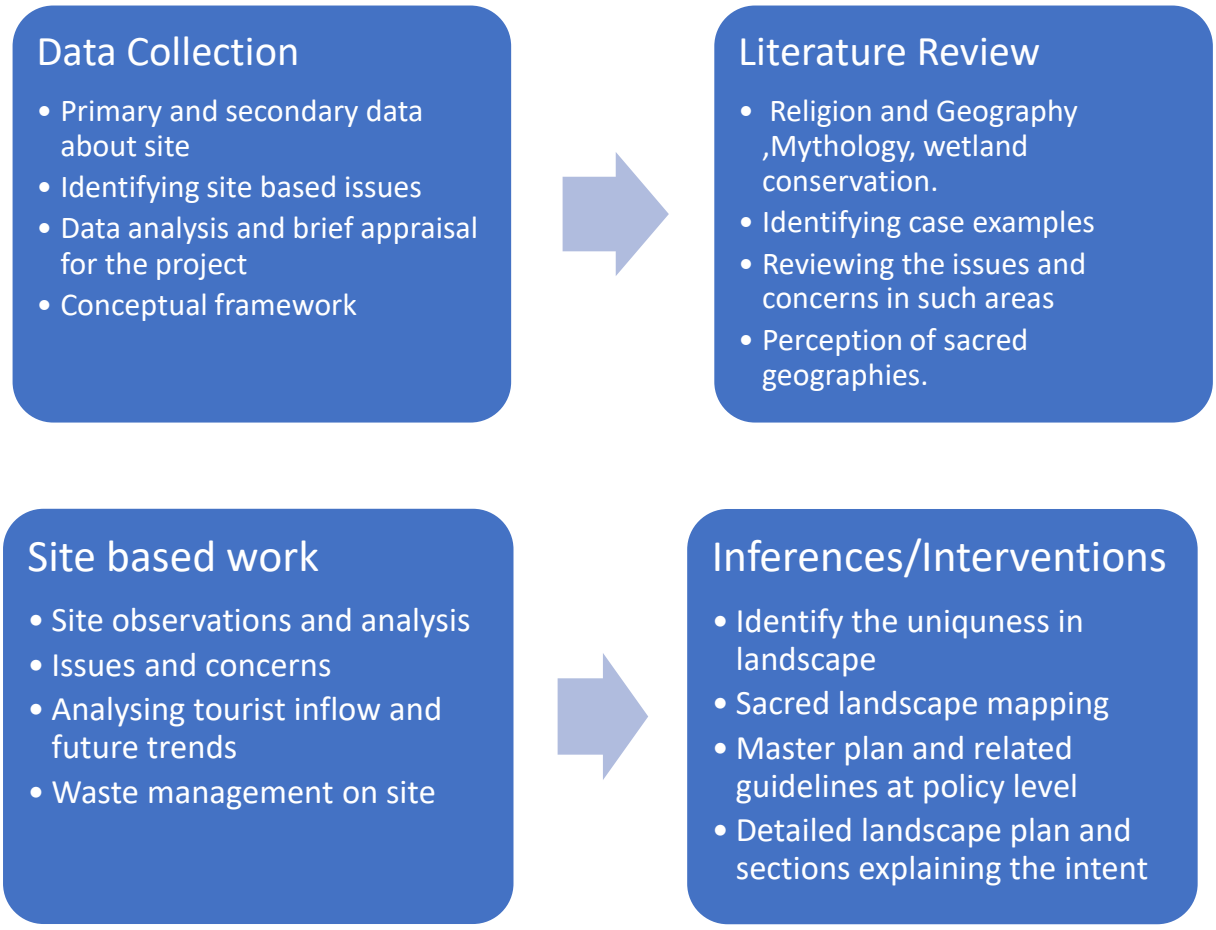
The idea focuses on understanding the landscape resource of constantly changing natural landscapes of Renuka Lake and designing the premise with an integrated approach towards the major constructs of this Place.

2.11 Objectives

- To understand and identify the uniqueness of landscape and ecology of Renuka Wetland and its associations with past and present time.
- Explore the idea of sacred space as a human construct.
- Identify the natural and cultural assets of the place.
- Water quality of Renuka Lake through research works and biodiversity assessment for the area.
- Identifying areas to create networks and spaces for tourists and cultural gatherings.
- Analyse landscape issues and try to revive the notions of this this place through landscape solutions.
- Develop a master plan incorporating tourist, cultural activities in harmony with biodiversity.

2.12 Methodology

Methodology to be used for this project will include:



2.13 Expected outcome

- A landscape master plan identifying the critical areas in the wetlands based on stresses, changing patterns of use and interaction with the surrounding ecology and addressing the same through case specific landscape design interventions.
- Planning and Management strategies that ensure ecological health of the landscape, preservation of its pristine quality, while facilitating human experiences through tourism and place association.
- Design interventions to minimize adverse human-nature interaction, and to improve and provide a seamless experience of the landscape.

3 LITERATURE REVIEW

The study of literature is based on essential keywords and knowledge domains. Before approaching the topic defining landscape, ecology and landscape ecology. Landscape, however, shows the plurality of meanings that the word embraces.

3.1 Landscape

“The English word landscape is a borrowing of the Middle Dutch word lantscap, Modern Dutch landscape, which in turn derives from the common Germanic land and the suffix schap meaning' constitution, condition,' while both the Old English landscape and the Old High German lantscap have the connotation of' region,'' tract.' (Makhzoumi, Jala; Pungetti, Gloria, 1999) The first and formal use of the term originated in the early 20th century by the geographer Otto Schulter, who defined two forms of landscape: the natural landscape or landscape that existed before major human change and the cultural landscape or landscape created by human culture.”

3.2 Usage of the Word ‘Landscape’

“Landscape preserves a wide range of meanings from a general perspective (e.g. countryside) to a separate geographical definition (e.g. district, region, estates). Cultural and political situations can also be implied. Indeed, according to different points of view, people have used the word landscape in different ways. It is possible to identify four major perspectives: landscape as scenery, as a specific place, as cultural expression, and as a holistic entity.” (Makhzoumi, Jala; Gloria, Pungetti, 1999)

3.3 Landscape as we see it

“In determining the landscape, three main factors can be identified: physical, biological and anthropogenic. This idea is the main starting point for our landscape definition. We therefore see landscape as a' dynamic process that develops on the visible surface of the earth, resulting from the interaction between abiotic, biotic and human factors that vary by site and time' (Pungetti, 1996a). This is what distinguishes landscape from ecology: while ecology deals with not necessarily visible environmental processes, landscape is a visible result of these processes.”(Makhzoumi, Jala; Pungetti, Gloria, 1999).

3.4 The dimensions of ecology

“Ecology has undergone radical transformations since its inception in the late nineteenth century: it has contributed to the conservation of nature, has provided the stimulus for the environmental movement and continues to advance as a scientific discipline. In the course of their historical development, ecological sciences, i.e.

ecology and landscape ecology, directly influenced the landscape and contributed indirectly to its understanding and appreciation (Makhzoumi, 1996b). Ecology is also perceived as the modern science' which deals most directly with ancient human and nature issues' (Botkin, 1990, p. 32). As such, ecology has the potential, like landscape, to offer different interpretations and to act in a variety of ways depending on the perspective and purpose for which it is used "(Makhzoumi, Jala; Pungetti, Gloria, 1999).

3.5 Myth and Mythology

“Myths are therefore one of the primary mechanisms by which identity is formulated and are therefore deeply involved in identity politics. From this point of view, they are at once a reflection of prevailing social and personal identities and a powerfully coercive template to form them. They signal moments of formation of identity; they raise important questions about the nature of being and origin; they do not necessarily involve claims about truth, but movements to assert or undermine discursive authority.”

3.6 Sacred Places

“It is defined as "restriction by pertaining to the gods"(Hubert,1997).This definition reflects that the" sacred "concept implies strict prohibitions and behavioural restrictions. Hubert (1997) stated that concepts of supremacy, respect, worship, and behavioural rules are common in different cultures to sacred sites.

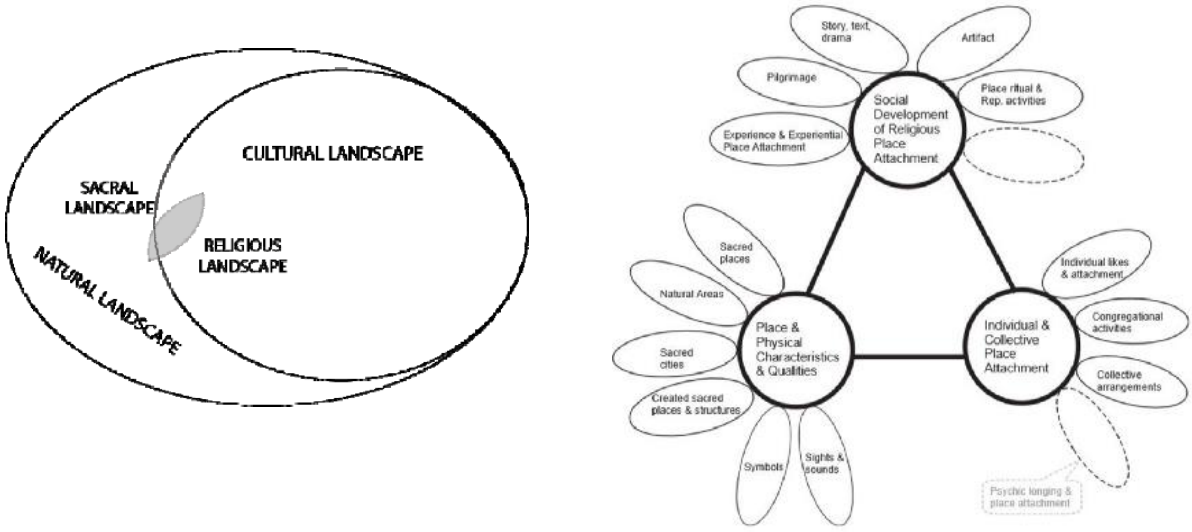


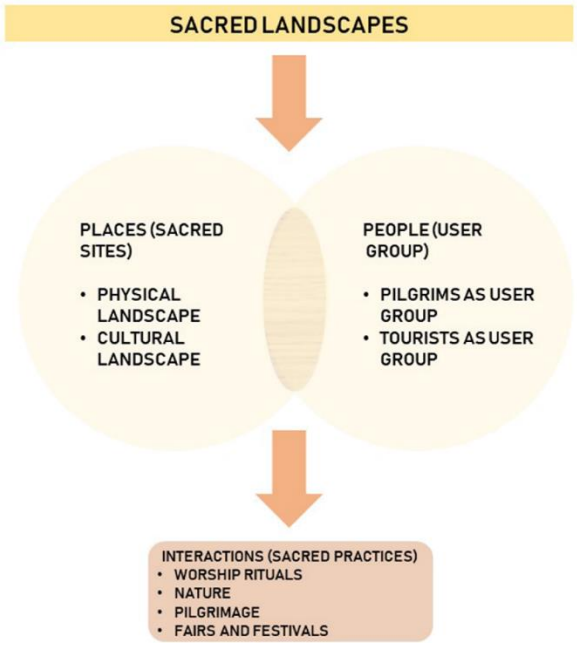
Figure 18: Concept of sacred places

3.6.1 Perception of sacred space

Sacred space is another category of space, defined as that part of the surface of the earth that is recognized as worthy of devotion, loyalty or esteem by individuals or groups. Space is severely discriminated against the world around it that is not sacred or profane. Naturally, sacred space does not exist, but sanctity is assigned as defined, limited, and characterized by man through his culture, experience, and goals. "Sacred" space exists for all people, for a truly profane world would consist of a totally homogeneous space with no value in it over another. This is not the case as all people provide some space with a qualitative value whether it is home, birthplace or fishing hole. Common discrimination is between profane space and sacred space, but it is impossible for an individual to see the world as a truly profane space because it discriminates between space in some sense. The third space category is the worldly space we live and act in. Mundane space ranks from profane to sacred somewhere along the continuum and simply indicates space valuation. It is the space in which man works and recognizes that it is different from the rest of the world, but not sacred.

3.7 Sacred Geography

“For indigenous cultures, sacred places have multiple levels of meaning. First of all, sacred places are creative acts, usually designed by a World Maker. Through the mythology of society, the places are revealed as physical manifestations of the mythological system.”



3.8 Archetypal Landscape

“The collective unconscious archetypes are said to maintain a uniform consistency in form and meaning over time. Their recurrent expression in the vernacular arts, dreams, even recent-time film allows for exploring these same archetypes in ancient contexts.” (Ronal J. Nash, 1997)

3.9 Sacred Space and Place Attachment

“The 'sacred' component in people-place attachment and the religious component of the emotional and spiritual connections to place.”

3.10 Water Symbolism in Sacred Landscape

“Water is described as the foundation of the whole world, the foundation of life and the elixir of immortality in ancient Hindu mythology (about 800 BCE). The ancient mythologies refer to water as the container of life, strength and eternity metaphorically and metaphysically. Water is perceived more frequently as a purifying medium. However, a series of consecrations, rituals and religious activities such as pilgrimage and sacred baths involve reaching the source and receiving the merit of "living water."

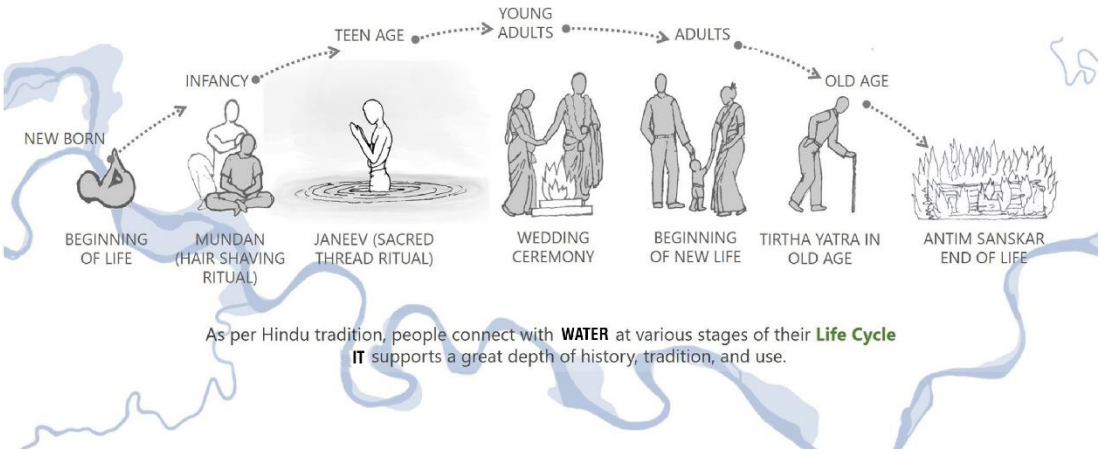


Figure 19:Water as symbolism

3.11 Key Theories

Folk songs and sacred places preserving culture and promoting tourism: A study of prominent areas in Himachal Pradesh: “Tourism is a development activity of our economy. And culture is the whole of everything that we think and do and have as a member of society. In many ways, the word culture is used. It means dance, music, languages, belief in art and literature in the common language. Many factors

have influenced our culture. Similarly, the rich culture of Himachal Pradesh is known. Although, due to its geographical location, it remained cut off from the outside world, its great culture cannot be unnoticed even today."

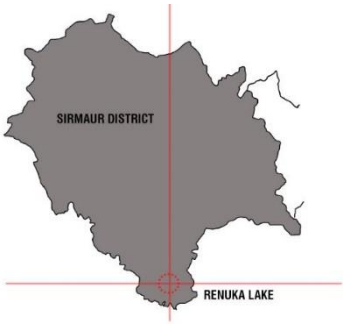
Meaning of the Concept "Pilgrimage": "The pilgrimage concept is directly related to the religion concept. Religion in India is an important and important aspect of Hindu. One of the most engaging features of the Middle Ages was won by the concept of pilgrimage. In Hinduism, the pilgrimage institution is of ancient antiquity and the textual evidence gives an idea that it was in vogue even during the Vedic period (4000 B.C. to 1000 B.C.) although it has undergone some minor changes since then."

India's Tirthas: "Crossings" In Sacred Geography: "One of Hindu tradition's oldest strands is what one might call Hindu piety's "locative" strand. Its ritual and reverence traditions are primarily linked with hill-to-hill tops and rock outcrops, river headwaters and confluences, forest pools and groves, and town and village boundaries. The place itself is the primary locus of devotion in this locative form of religiousness, and its ritual and pilgrimage traditions are usually much older than any of the specific myths and deities that attach to it. These places are often called tirthas in the wider Hindu tradition, especially those associated with waters, and pilgrimage to these tirthas is one of the oldest and still one of the most prominent features of Indian religious life."

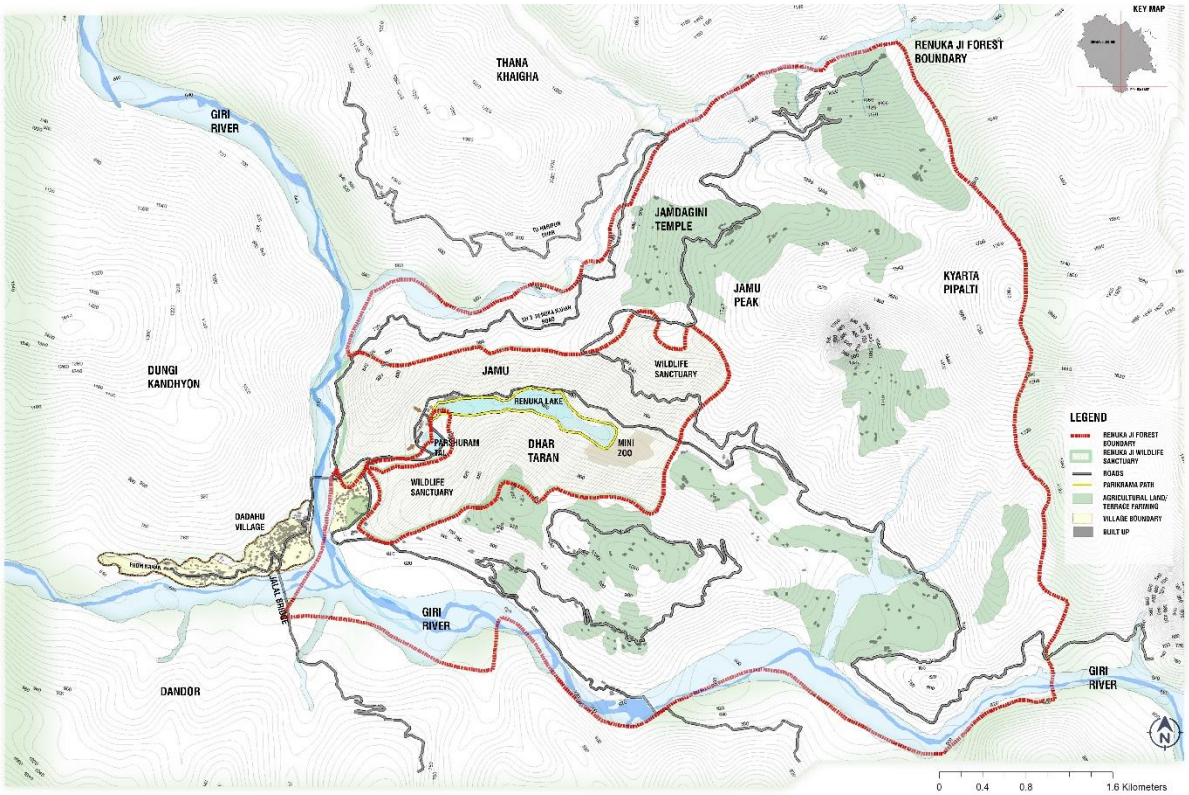
4 SITE DOCUMENTATION

4.1 Site location

There are several natural lakes in Himachal Pradesh with altitudes between 400 and 5000 meters above sea level. Renuka is a major lake located in the low subtropical zone about 60 km from Nahan in the Sirmaur district. It is one of the most sacred lakes in Northern India and thousands of pilgrims visited it in November each year during a week-long fair. It is also a great tourist attraction for its picturesque location.

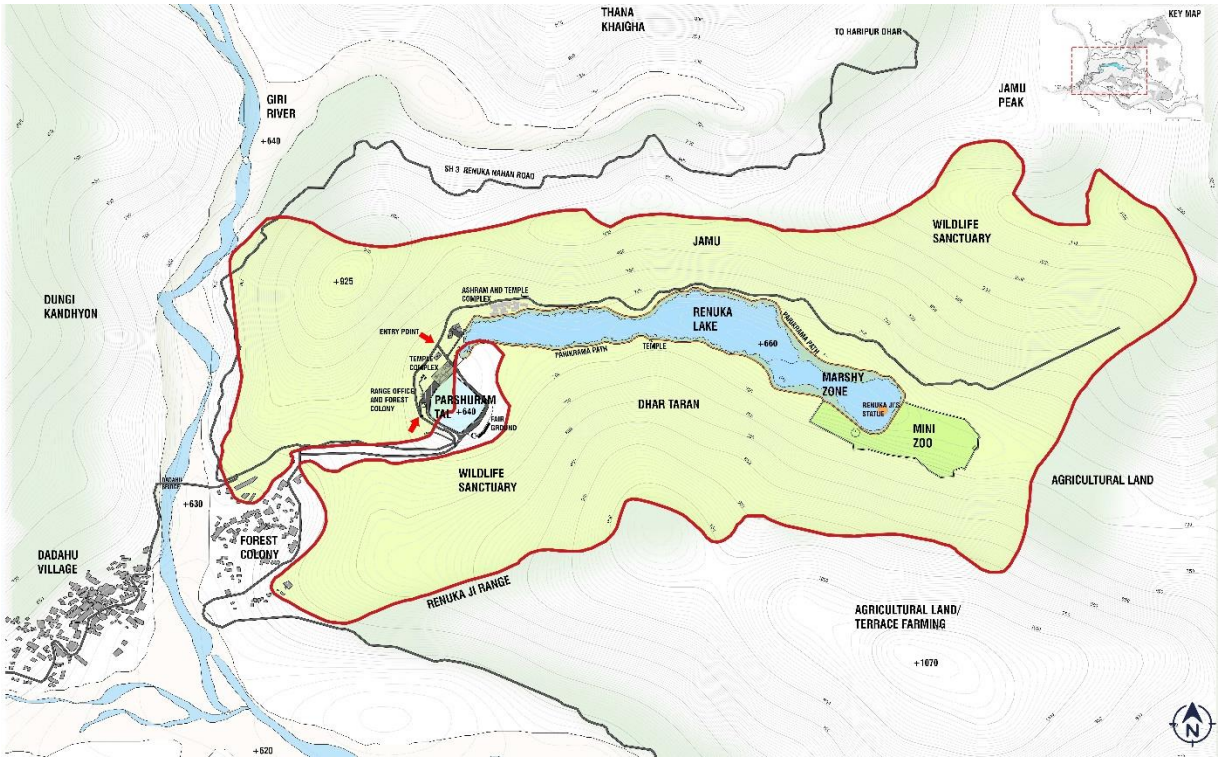


4.2 Base maps



Map 9: Large scale Regional map

The map depicts the region with reserve forests, strategic locations and villages in context to Renuka lake. The Giri river passes from the western side, the lake drains into the river during peak times. It also marks the settlements and the agricultural land.



Map 10: Base map of Renuka wildlife and lake

The map marks the boundary of Renuka wildlife sanctuary along with nearby settlements. Its core area comprises of Renuka Lake, Parshuram Tal along with places of religious and ecological importance.

4.3 Site Sections

Figure 20: Section through temple complex

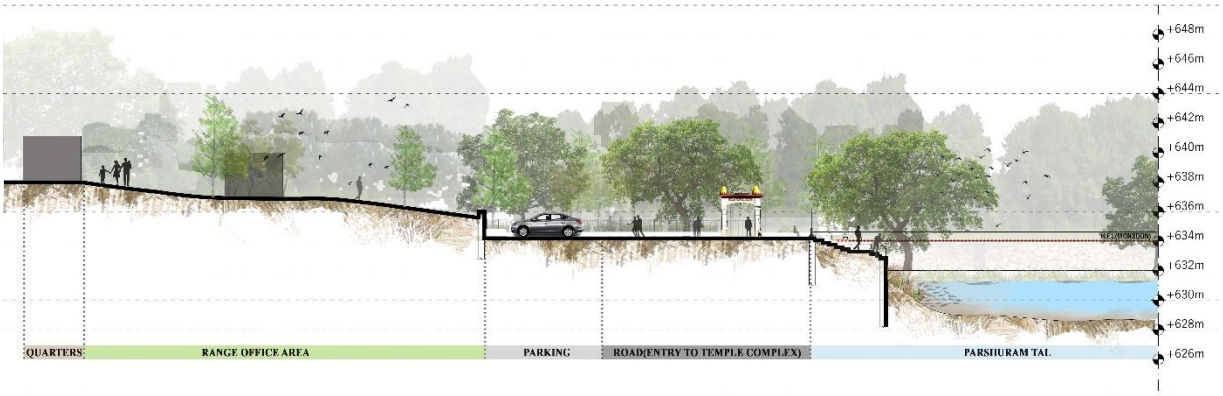


Figure 21: Section through parking area and entrance

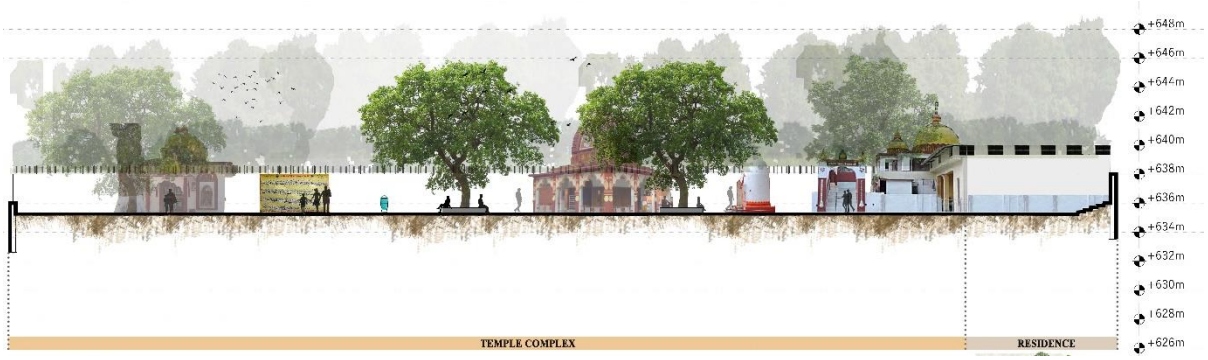


Figure 22: Renuka temple complex

Figure 23Section through fish feeding and sitting area

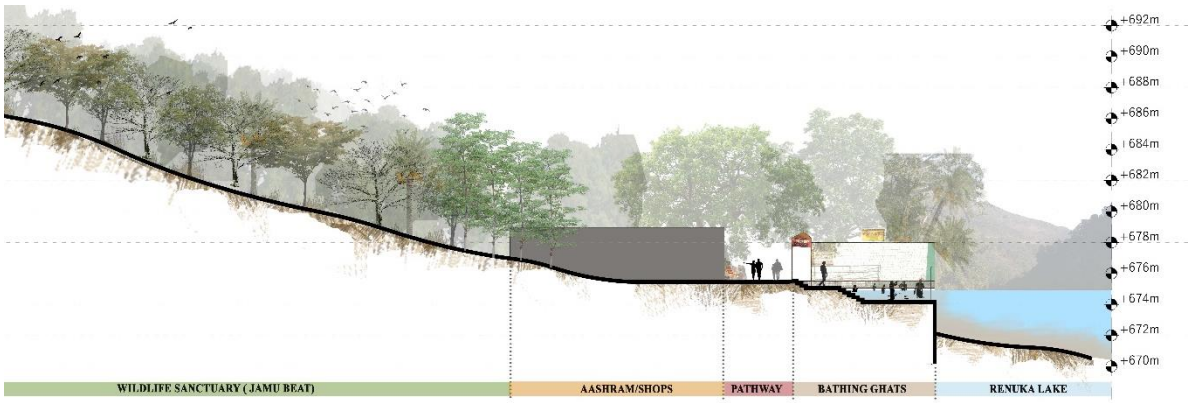


Figure 24: Section through bathing ghats and shops

Figure 25: Section through boating area

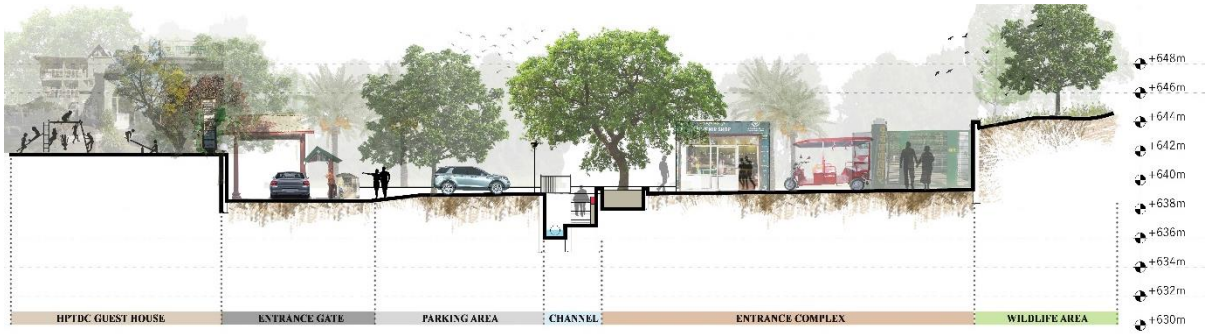


Figure 26: Section through plaza area

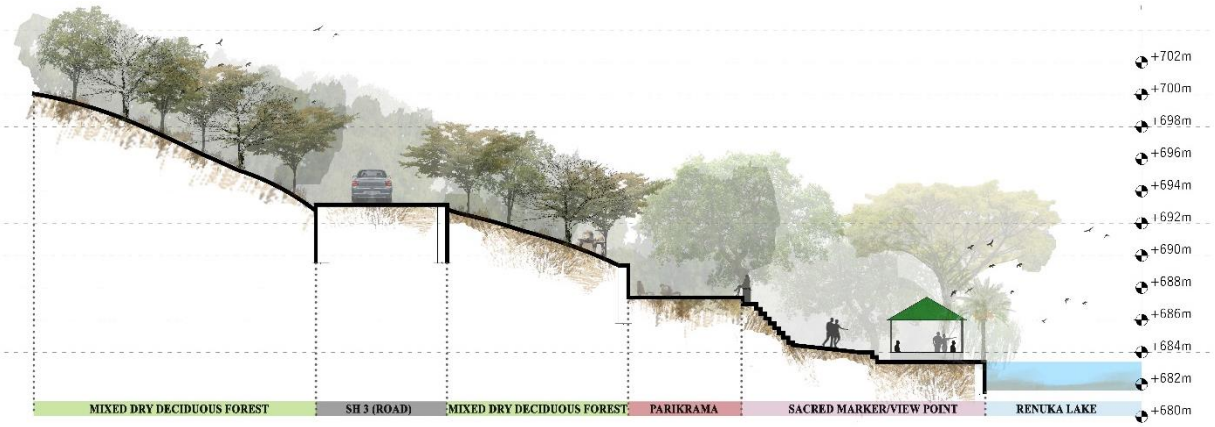


Figure 27: Section through Pause point

Figure 28: Section through mela ground

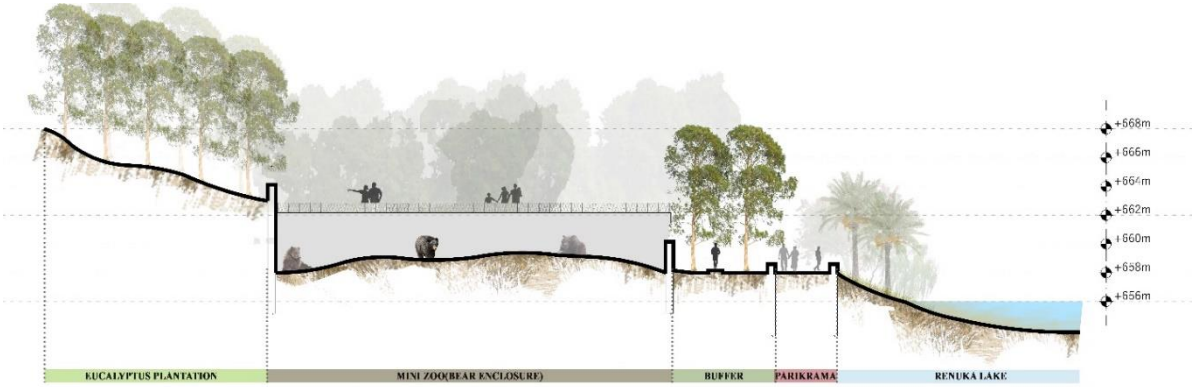
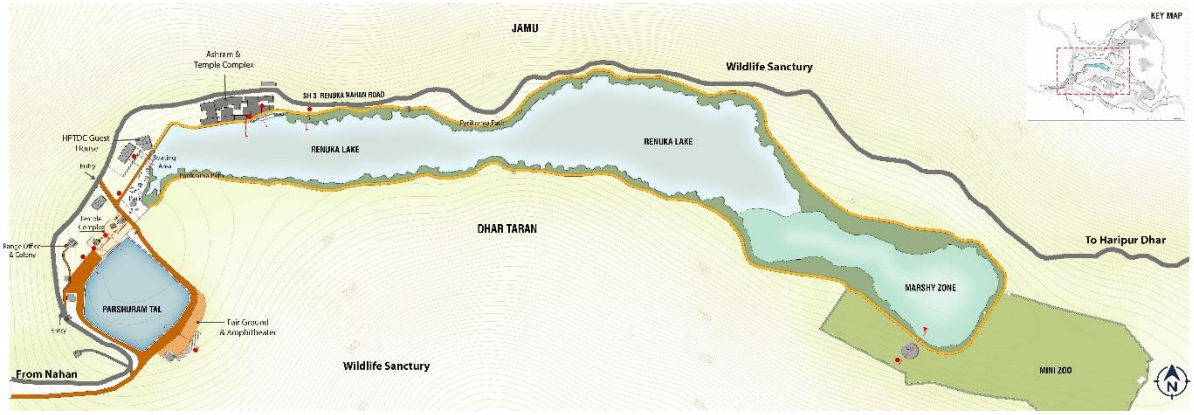


Figure 29: Section through Mini zoo

4.4 Highlights

The lake is surrounded by dry deciduous forest and Sal forest on all the sides with hills rising up on either side which marks the wildlife sanctuary of the area. The circumference of lake is dotted by eucalyptus plantation on one side and lake edge species on the other hand.



Map 11: Map showing Renuka lake and environs

The entrance is marked by the Parshuram Tal and mela ground at one end. There are two temples, one at the top of hill which is Parshuram Temple and the other one as we enter the premise, Renuka ji Temple which was built by the Gorkhas. As we move further, we see boating area and an Hptdc guest house and later the parikrama path commences along with aashram, shops and bathing Ghats running along the path. As we move further, we enter into a pristine zone which has few pause points and a mini zoo along with it.

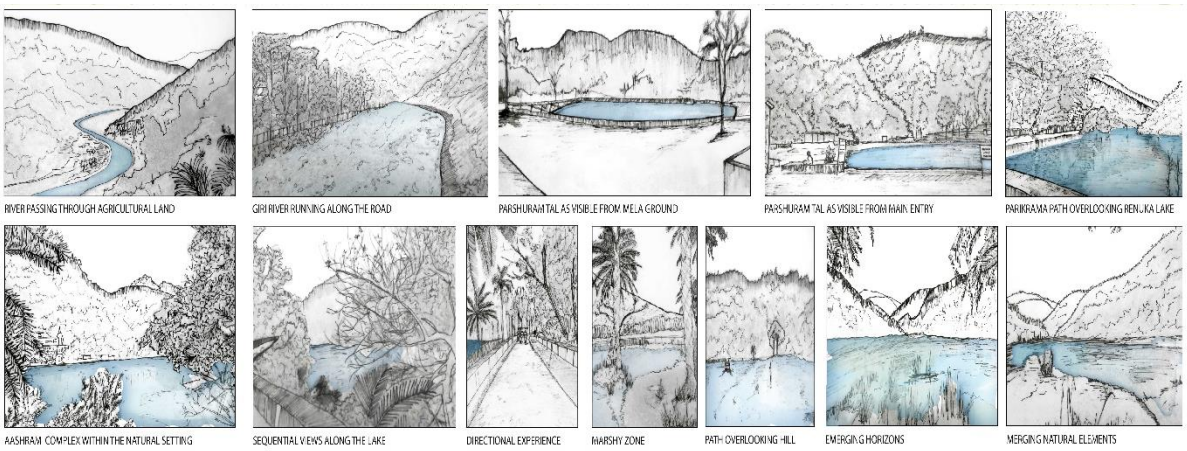
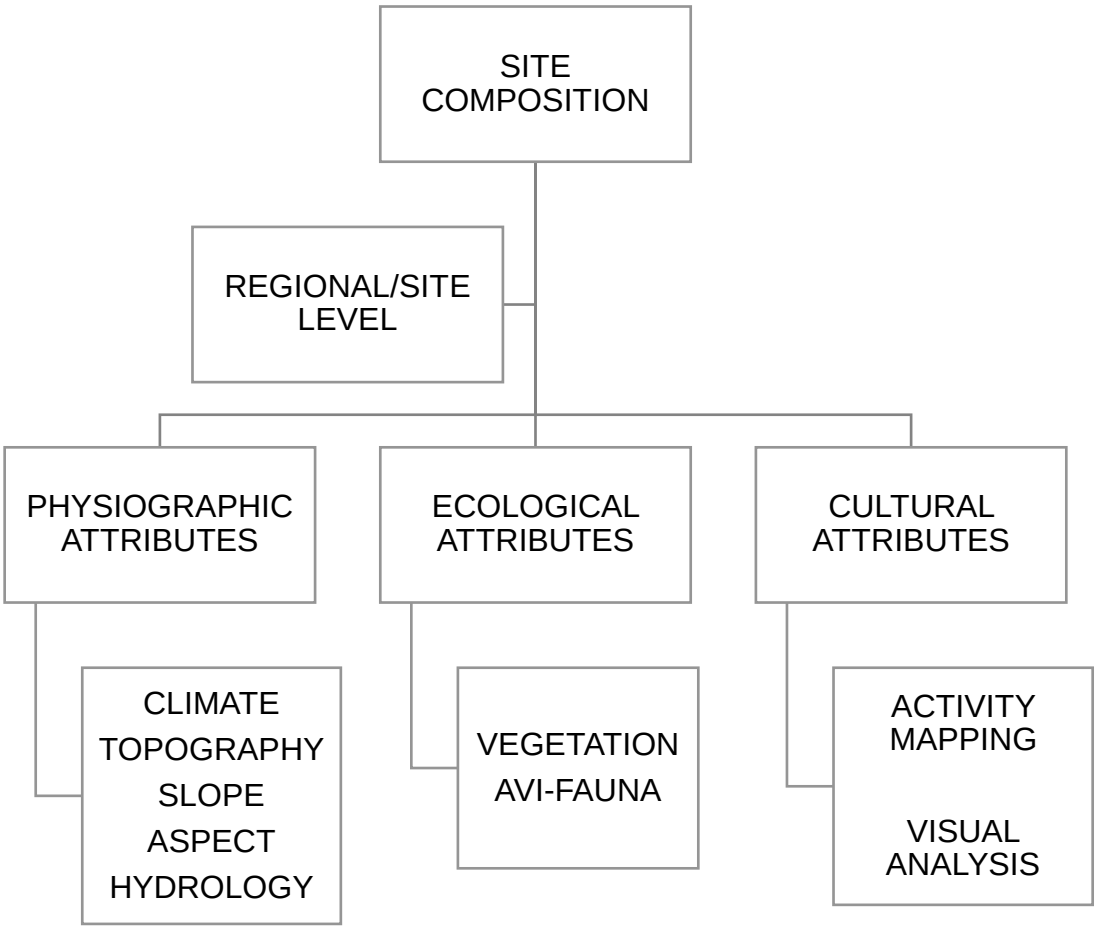


Figure 30: Walkthrough the lake

5 SITE INVENTORY AND ANALYSIS

5.1 Study Methodology



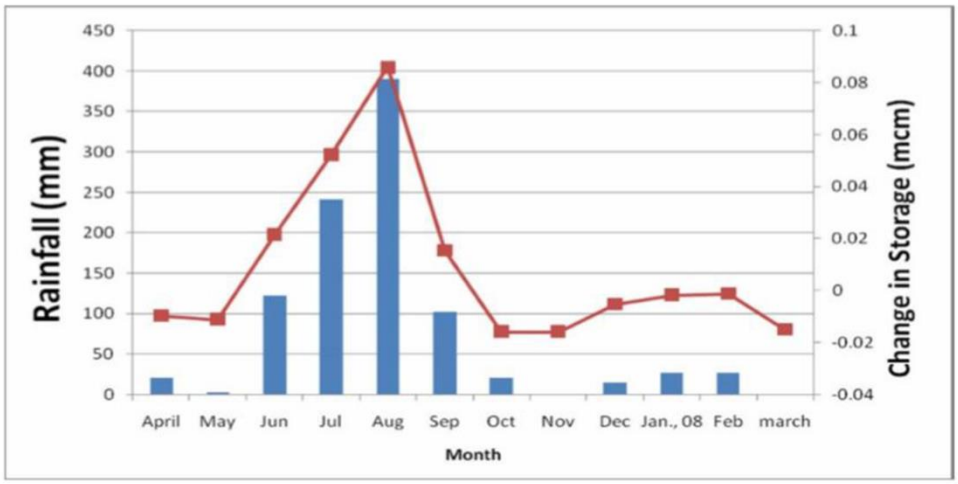
The methodology adopted for carrying out the analysis is broadly classified into three parts:

Physiographic Attributes
Ecological Attributes
Cultural Attributes

5.2 Climate

The district is characterized by a variety of weather, varying by elevation. Summer months in the Kiarda Dun valley are extremely hot. Although the Dharthi range is hot, the hilly areas have a temperate climate. The climate varies between hot and dry (up to 1,800 m) and moderate (1,800-2,500 m) and cold to very cold at higher altitudes (2,500-3,630 m). The vegetation's origin, development and maturity are affected by rainfall, relative humidity, snowfall, temperature and wind as described below:

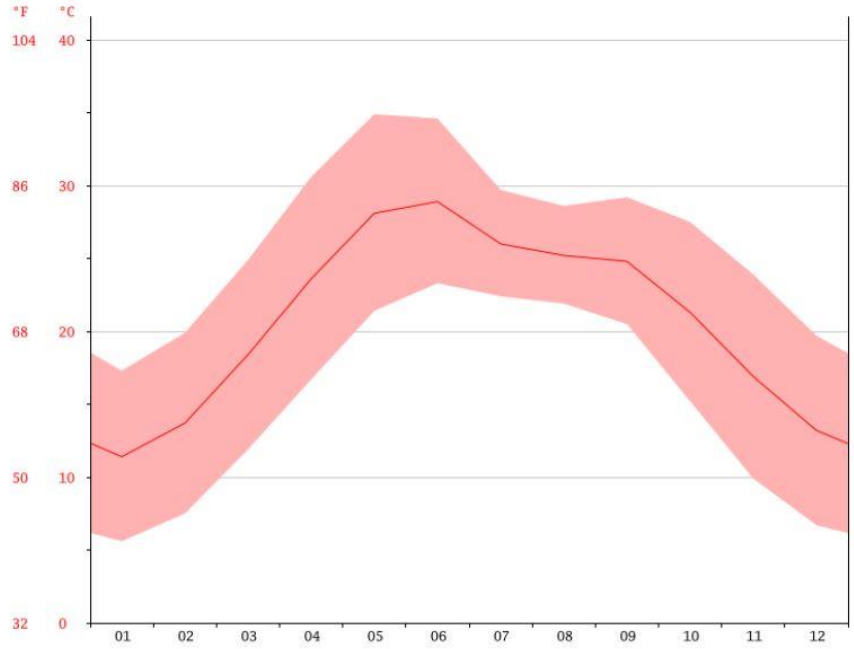
Rainfall: The district has an average 1,014-1,547mm annual rainfall with an average of 1,250mm. During the monsoon season, i.e. July-August, approximately 81 percent of total rainfall is experienced. The winter months are dry, accounting for about 11.5% of the annual rainfall.



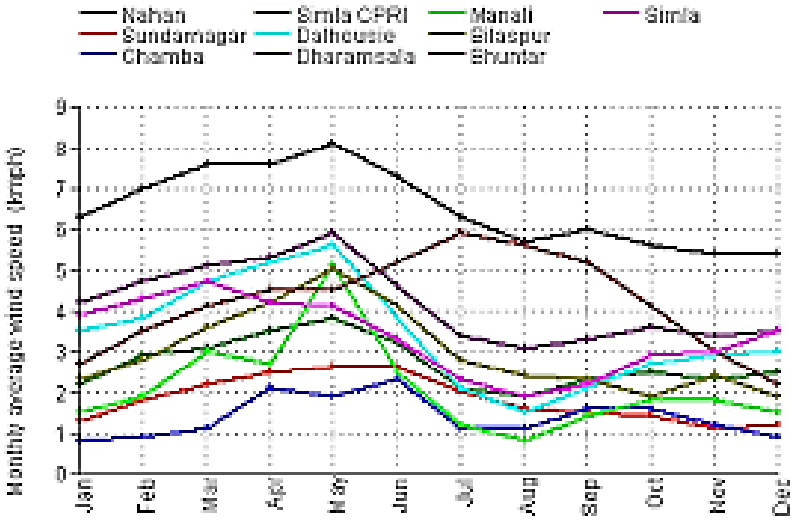
Relative humidity: It is low in the rainy season (July-September) between April and June (50-64 percent) and maximum (74-94 percent).

Snowfall: It takes place above altitudes of approximately 1,800 m. It begins in mid-November and continues until February, but remains in the higher reaches at the peak of Churdhar until April.

Temperature: The temperature varies from altitude to altitude. The summer temperature (May June) ranges from 15 ° C to 42 ° C, whereas the winter temperature (November-February) varies from 0 ° C to 21 ° C, depending on a place's physical location.

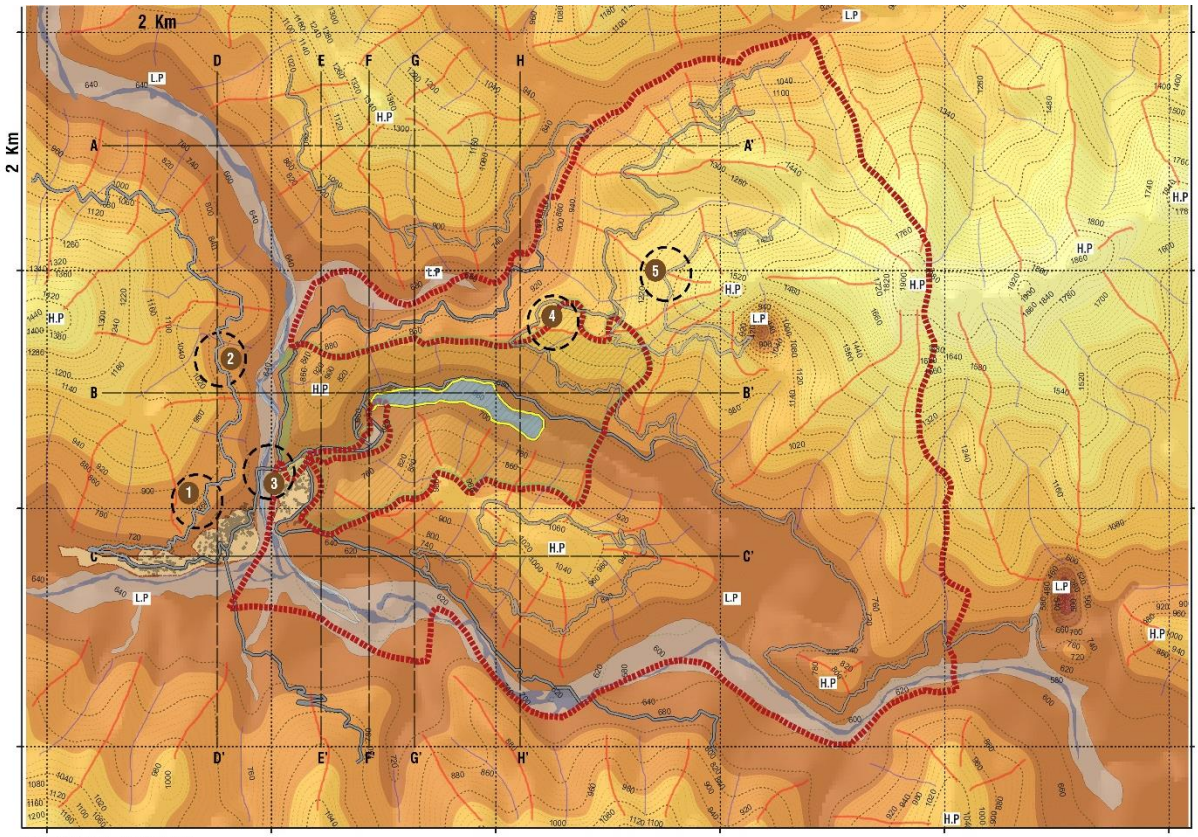


Winds: The velocity of winds in low and intermediate zones is low to moderate. On the other hand, during summers as well as winters, strong winds blow over 3,000 m.



5.3 Physiographic attributes

5.3.1 Topography



TOPOGRAPHY MAP

0 0.5 1 2 Km

GRID SIZE : 2 X 2 Km

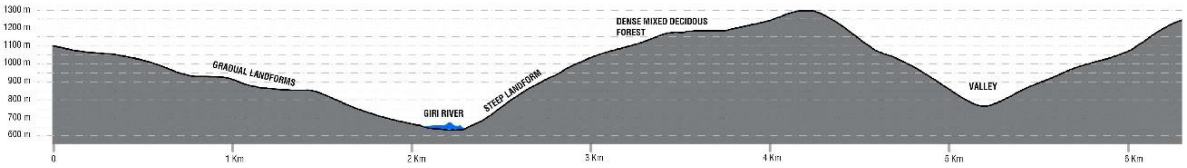
LEGEND

- RENUKA JI FOREST BOUNDARY
- WILDLIFE SANCTUARY BOUNDARY
- ROADS
- VILLAGE BOUNDARY
- BUILT UP
- RIDGES
- VALLEYS
- H.P HIGH POINT
- L.P LOW POINT
- MINOR CONTOURS
- MAJOR CONTOURS
- GIRI RIVER
- RENUKA LAKE
- 150-350m
- 350-550m
- 550-750m
- 750-950m
- 950-1,150m
- 1,150-1,350m
- 1,350-1,550m
- 1,550-1,750m
- 1,750-1,950m

VANTAGE POINTS OFFERED BY TOPOGRAPHY OF THE REGION

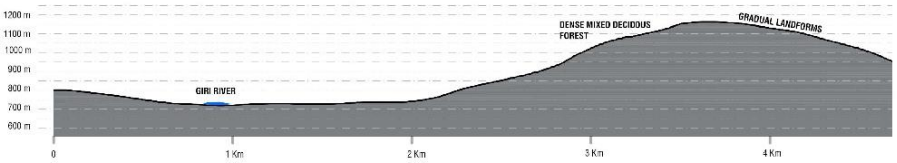
Site elevations, affect both drainage patterns and visibility. Variation of elevation on a site and the surrounding landscape determines the size and spatial configuration of local views-heds.Visible areas may encompass portions of the site,or the entire site, and they may extend into the surrounding landscape.

1. This point lies at an elevation of 760m overlooking to the Giri river at the low lands with the backdrop of Shiwaliks. This point can act as a pause point while moving through the scenic road.
2. This point lies at an elevation of 920m, it becomes a place for passing tourists to stop by the place and take pictures, as this viewshed provides a skyline of the shiwaliks with the foreground of river and settlements
3. This point lies at an elevation of 720m which is the Dadahu bridge connecting the village to the Lake area, also leading to certain tourist destinations thus, becomes a point to harness visually being closest to the foothills and the river.
4. Jamu peak which lies at an elevation of 920m, overlooks to the Renuka Lake from a higher point, people trek to this area to have an overview to this view. It clearly displays the overall landscape of the region.
5. This point lies at an elevation of 1360m also called Tape ka tila, symbolizing the location where Rishi Jamdagini meditated, it lies at an another peak from where the hills are visible at a lower level.

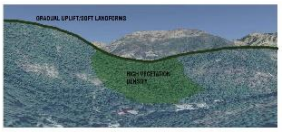


SECTION AA'

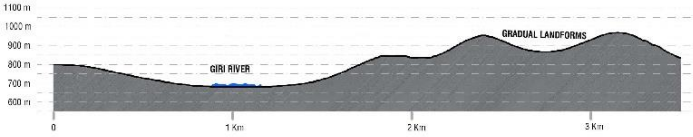
SECTION BB'



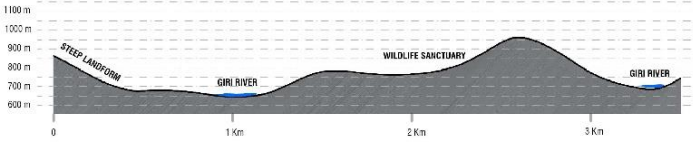
SECTION CC'



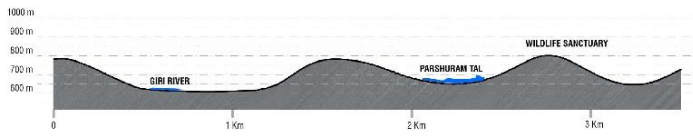
The vegetation density varies at different landforms, at the ridges the land has a rocky structure with very less or no vegetation. The density of vegetation increases in the valleys where moisture is retained as it acts as the natural streams which feed the water body throughout the year.
The landforms have a very gradual uplift at the mid hill level but are steep at the foothills which is eroded as causing sedimentation in river and lake.



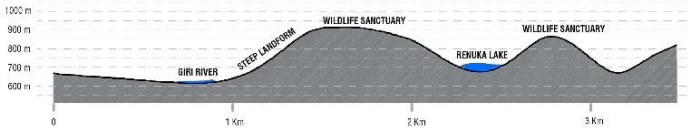
SECTION DD'



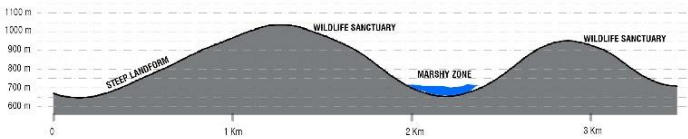
SECTION EE'



SECTION FF'



SECTION GG'



SECTION HH'

0 0.5 1 Km

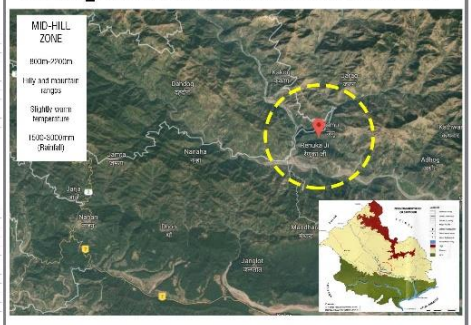
SECTIONS SHOWING TOPOGRAPHY AND LANDFORM OF THE REGION

TOPOGRAPHY DEPENDENT LANDUSE AND EROSION PROCESSES

Erosion processes differ spatially depending on hillslope profile and land cover.

The River Giri divides the district geographically into low hills 'Cis-Giri' (Giri war) and high hills 'Trans Giri' (Giri par) parts with third part as 'plains of Poanta Kiarda Dun Valley'. The area is structurally complex and rocks are mainly ***sedimentary*** with ***abruptly rising peaks***, otherwise having gentle slopes and are famous for Chur-peaks and Shimla ridge.

KEY MAP_SHOWING REGION FALLING IN SHIVALIK HILLS



The Sivalik Hills is a mountain range of the outer Himalayas.This range is about 2,400 km long enclosing an area that starts almost from the Indus and ends close to the Brahmaputra, The width of Sivalik Hills varies from 10-50 km, their average elevation is 1,500 to 2,200 m.

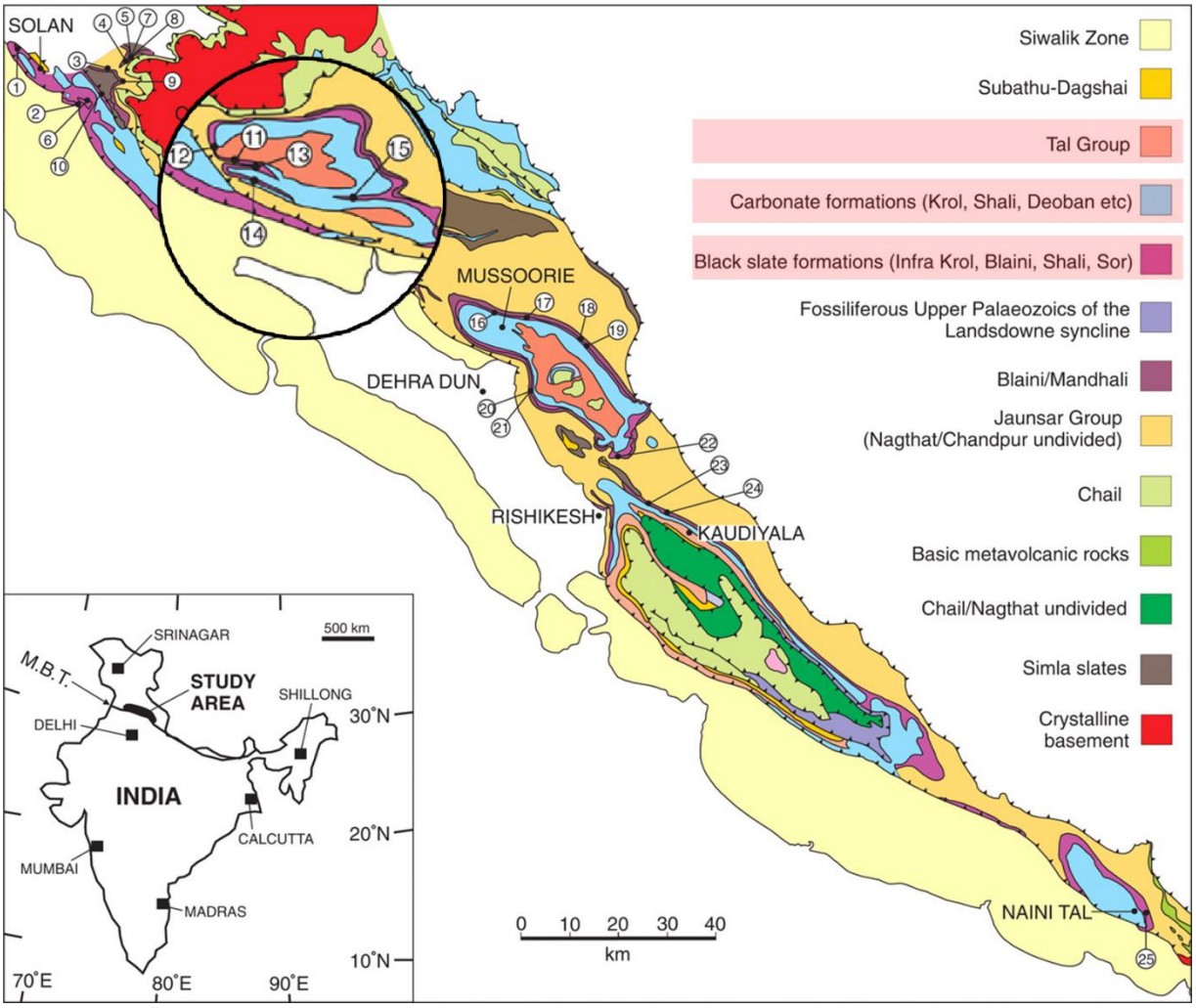
The average elevation of the region lies between 600m to 2100m above mean sea level. The Giri River geographically divides the district into the low hills of' Cis-Giri' (Giri war) and the high hills of' Trans Giri' (Giri par) with the third part as' Poanta Kiarda Dun Valley plains.' The area is structurally complex and rocks are predominantly sedimentary with abruptly rising peaks, otherwise with gentle slopes and famous for Chur-peaks and Shimla ridge.

Cis giri region: The region of Cis-Giri is intersected by three main ranges running from northwest to south-east. The first range is the parallel running Sain Dhar to the Giri river. The second range is the Dharthi Dhar or what is known as the small range. River Jalal flows between these two Dhars. The third one is quite a low range that runs south of Nahan tehsil from Kala Amb area and forms an open valley with Dharthi Dhar.

Trans giri region: It consists of wild mountains that culminate in the Chur peaks popularly known as Chur Chandni Ki Dhar (the silver bangle hill). Mostly hilly, this region includes the area of Haripurdhar, Kamrau, Nauradhar and Shillai. This area is home to the highest peak of this district, Churdhar (3,630).

Poanta or Kiarda Dun Valley: To the eastern end of the Dharthi range, there is an open wide valley known as Kiarda Dun which borders the eastern Yamuna and Giri rivers and forms Sirmaur's boundary with Uttarakhand.

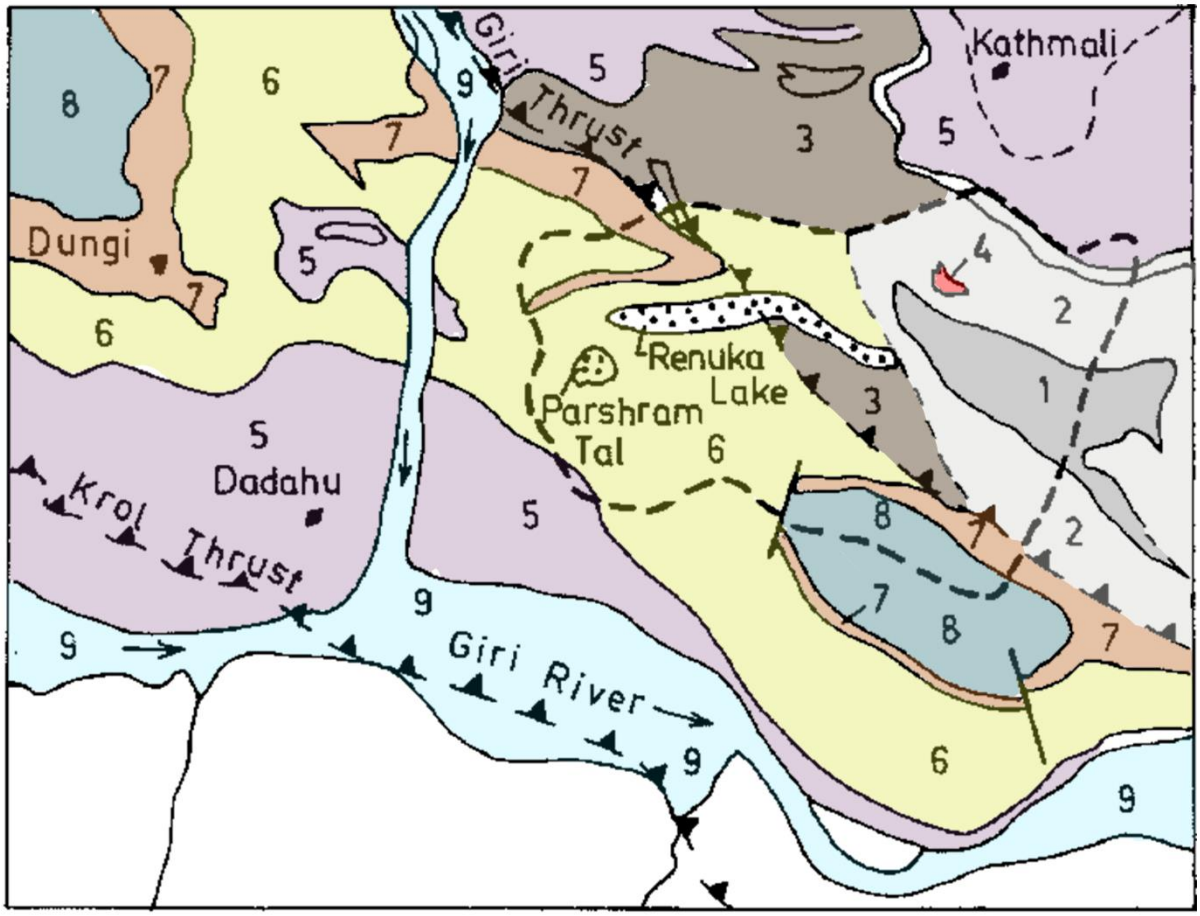
5.3.2 Geology

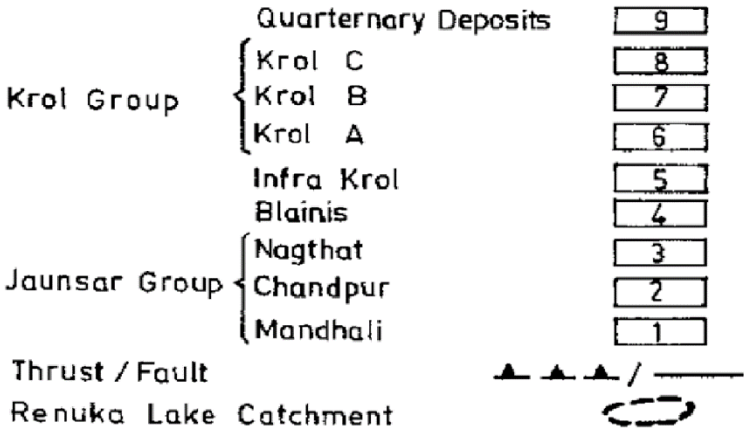


Renuka Lake surrounded by mountains comprised of highly crumpled, shattered, crushed, folded and dislocated rocks consisting of carbonaceous shales-slates often pyrite ferrous, limestone, quartzite, boulder beds etc.

1. Boulder bed and limestone
2. Slates
3. Quartz
4. Boulder bed and dolomite
5. Carbonaceous shales
6. Limestone and shale

7. Red Shale
8. Blue grey Limestone





This region lies between the great Himalayas and the Shivaliks. The area is structurally complex and rocks are predominantly sedimentary with abruptly rising peaks, otherwise with gentle slopes and famous for Chur-peaks and Shimla ridge.

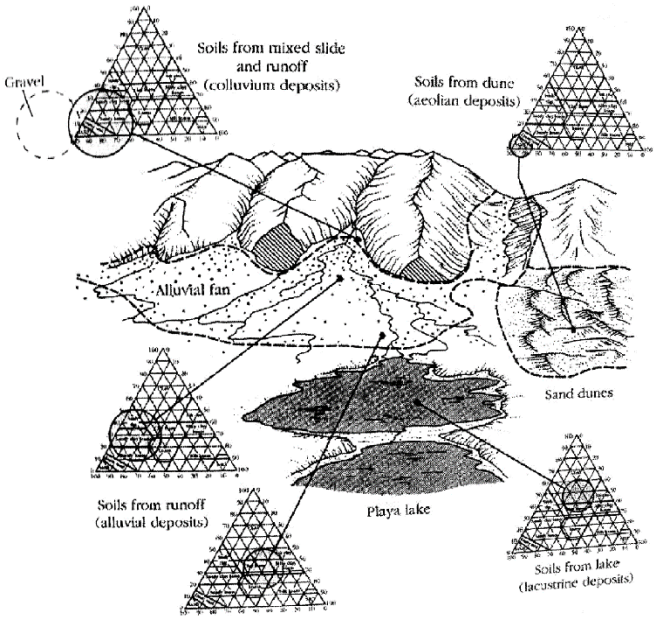
5.3.3 Soil

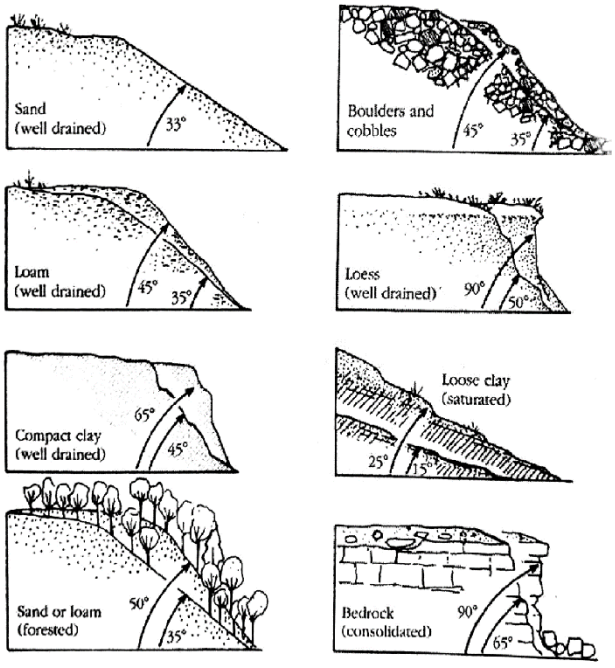
The soil is colored loam to clayey-loam and grayish-brown. This soil type is found in the lower part of Pachhad, Renuka, and Nahan in the northwest. The soils in reaction are neutral to slightly acidic, suitable for maize, wheat, potatoes, stone fruits, and fodder crops cultivation.

This region's soil composition reflects the hetrogenic mixture in different portions of carbonate rocks, sandstones, shale and silt stones (Srikantia and Bhargava 1998).

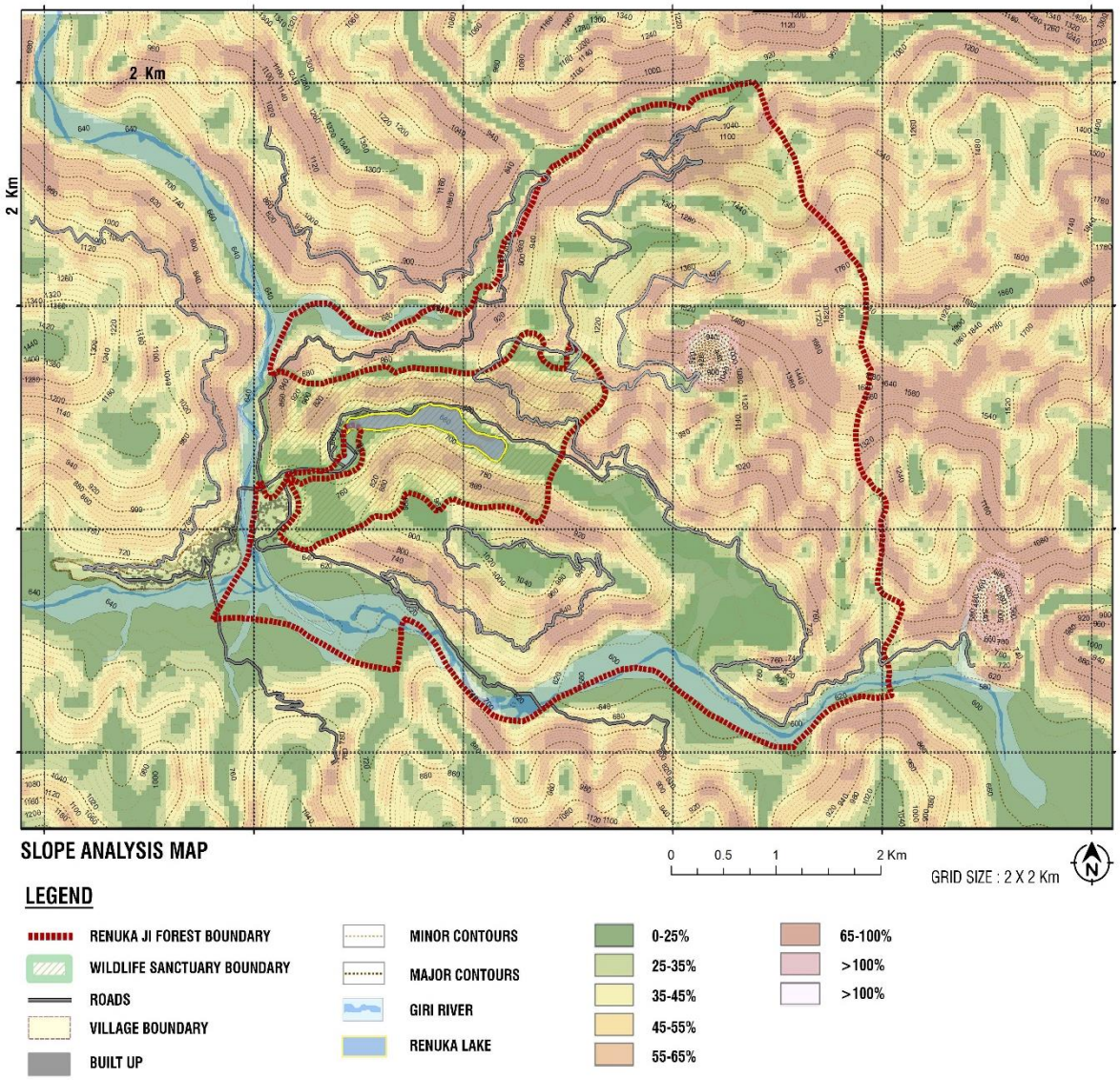
Colluvium (also colluvial material or colluvial soil) is a general name for loose, unconsolidated sediments that have been deposited at the base of hillslopes by either rainwash, sheetwash, slow continuous downslope creep, or a variable combination of these processes. Colluvium is typically composed of a heterogeneous range of rock types and sediments ranging from silt to rock fragments of various sizes.

Soil Type – Medium deep, well drained, fine loamy, calcareous, with loamy surface and severe erosion on moderately steep slopes.

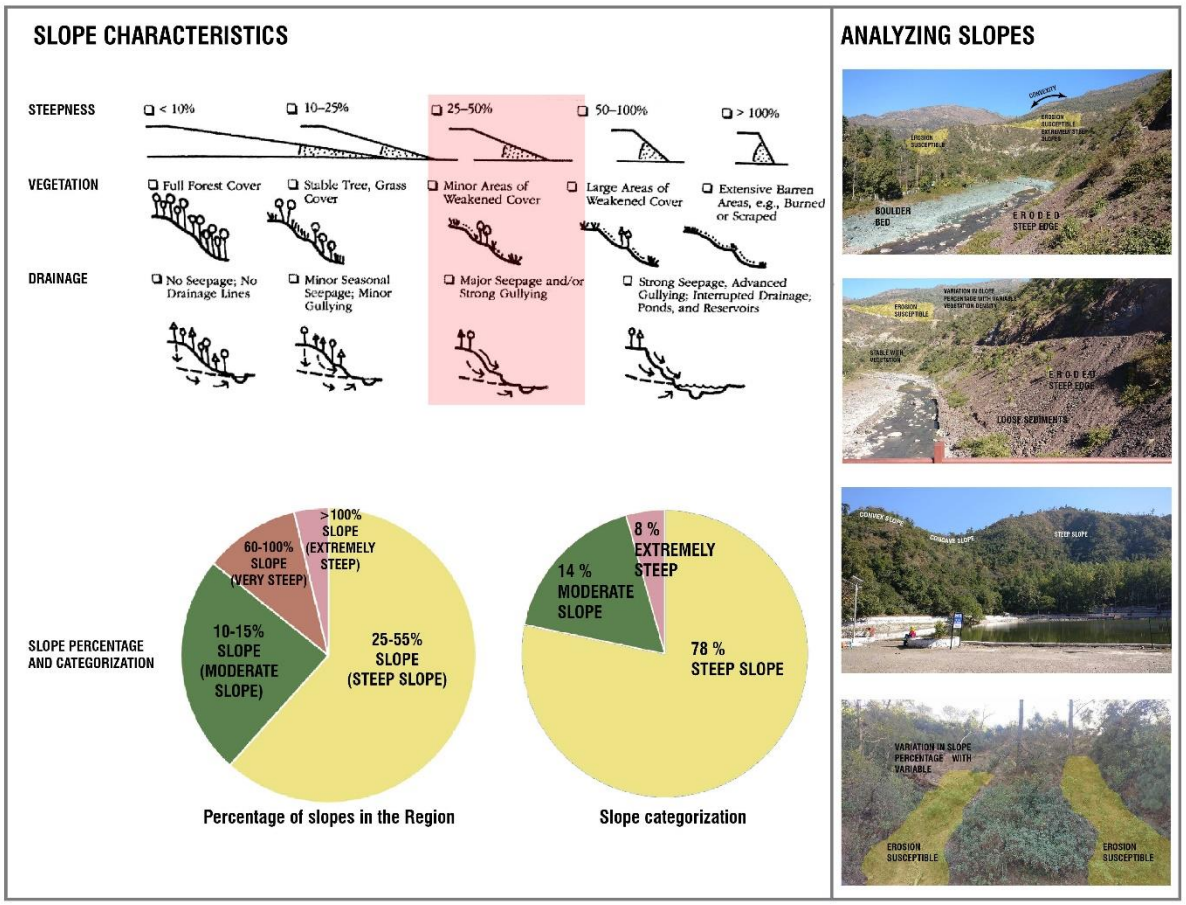




5.3.4 Slope

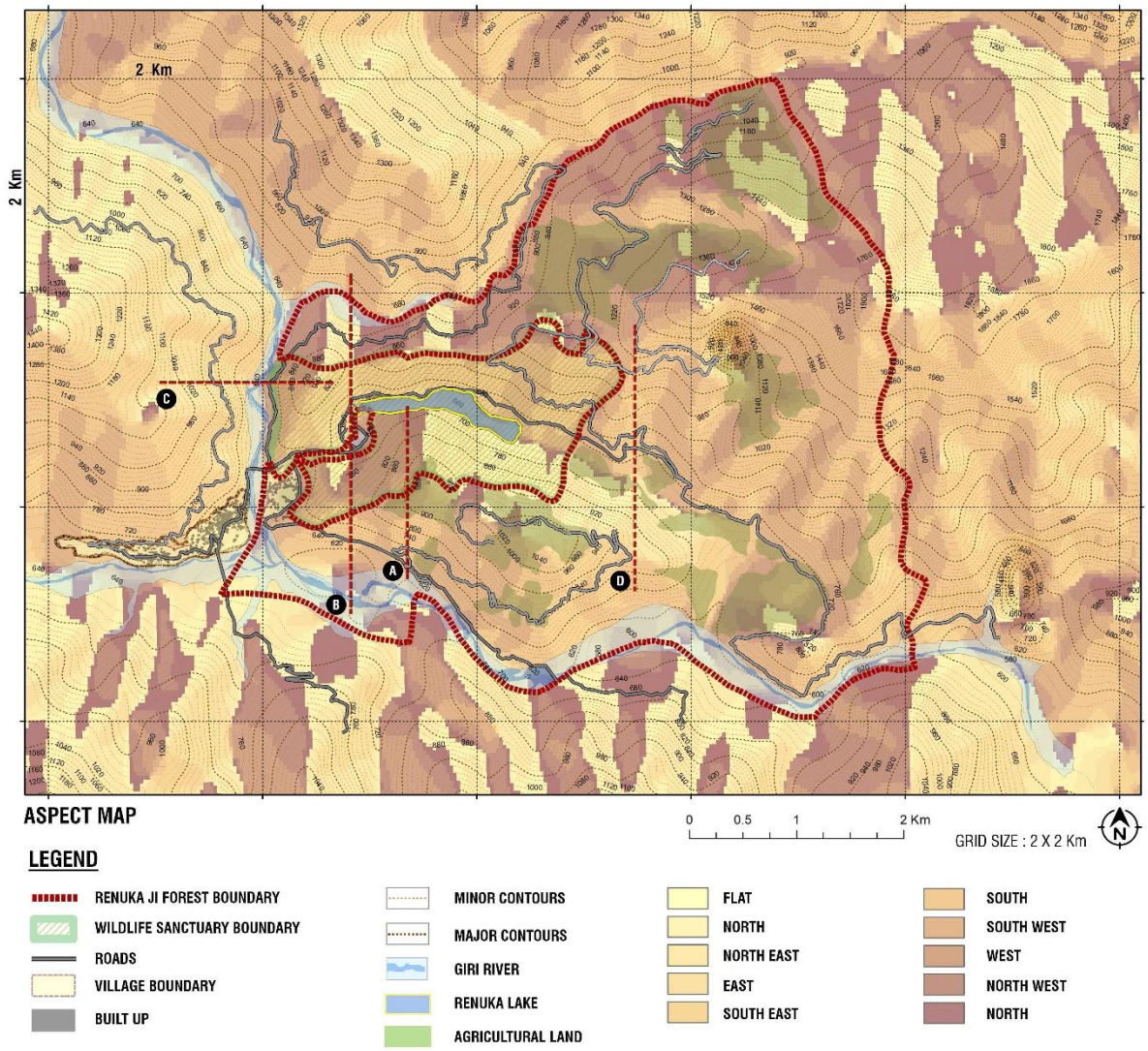


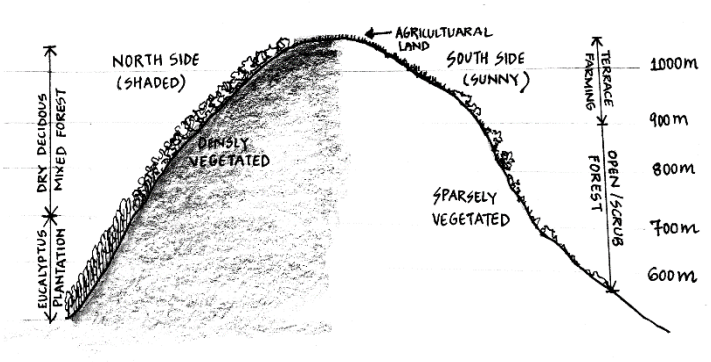
Maximum slope percentage lies between 25-55% which is categorized as steep slope, also the soil and geological strata includes loose sediments with moderate density of vegetation which leads to erosion and sedimentation in lake.
78% of the total area has a slope of 25-55%
14% of the total area has a slope of 10-15%
8% of the total area has a slope of 100% and above.



1.Straight	2.Convex	3.Concave	4. S-shaped	5. Irregular
				
Stable , moderate vegetation.	Indicates extensive vegetation, formed by deposits (natural or manmade) over a period of time.	Indicates past disturbances from logging operations, road building, pipeline construction destabilising subsurface conditions such as ground water seepage	Stable slopes, substantial plant cover. Found in hilly terraon, mountain foothills, and coastal areas, where there is permanent forest cover.	Reflects variety of conditions. Alternating steep and gentle segments. changes with moisture content.

5.3.5 Aspect





Variation in aspect influence the amount of solar radiation received by the site on a daily and seasonal basis.

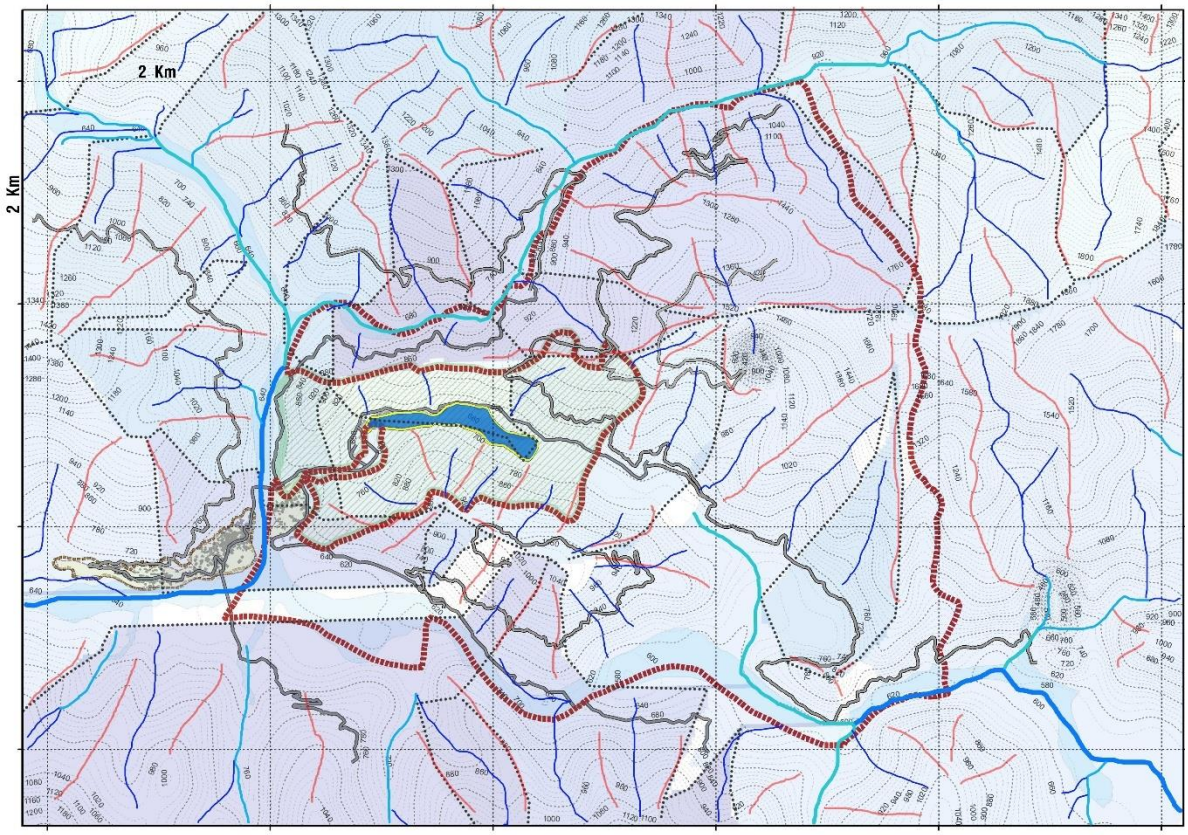
The north-facing slopes, when exposed to direct sunlight, receive less solar radiation per unit surface area.

Variation in slope and aspect influence the amount of solar radiation received by the site on a daily and seasonal basis. For example, in the Northern Hemisphere, north-facing, ten-degree slopes will receive less solar radiation than south-facing slopes of the same gradient. In the winter, the sun's highest point above the horizon is an acute angle. The north-facing slopes, when exposed to direct sunlight, receive less solar radiation per unit surface area than do the south-facing slopes.

Inference:

The land use and land cover in this zone is based on the direction of the slopes. The vegetation density varies with orientation of slopes, the slope facing north retains more moisture and thus has higher vegetation density as comparable to the southern slopes. Also, the density varies with shadow, if there is a higher topography in front of lower hills, the slope facing south has high density as sunlight is not incident, but in a diffused form. The agricultural land is majorly on the southern modereate slopes due to the presence of direct sunlight which is essential for crops.

5.3.6 Hydrology



HYDROLOGY MAP

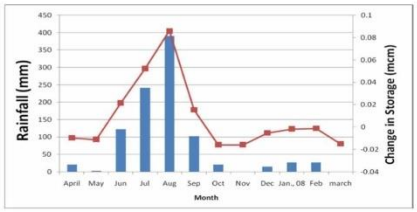
0 0.5 1 2 Km

GRID SIZE : 2 X 2 Km

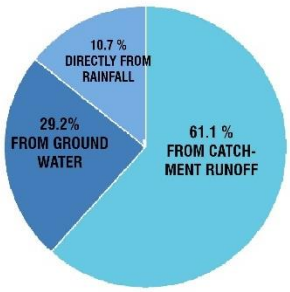
LEGEND

- RENUKA JI FOREST BOUNDARY
- WILDLIFE SANCTUARY BOUNDARY
- ROADS
- VILLAGE BOUNDARY
- BUILT UP
- MINOR CONTOURS
- MAJOR CONTOURS
- GIRI RIVER
- RENUKA LAKE
- RIDGE
- 1ST ORDER STREAM
- 2ND ORDER STREAM
- 3RD ORDER STREAM
- 4TH ORDER STREAM
- WATERSHED

Month	RF mm	RF mcm	RO mcm	GWI-GWO mcm
April	20	0.004	0.0006	0.0092
May	2	0	0	0.0178
Jun	122	0.022	0.1066	0.0126
Jul	241	0.043	0.3203	0.0036
Aug	390	0.069	0.4488	0.1211
Sep	102	0.018	0.0737	0.1343
Oct	20	0.004	0.0006	0.142
Nov	0	0	0	0.0209
Dec	14	0.002	0.0028	-0.0051
Jan., 08	26	0.005	0.00001	-0.001
Feb	26	0.005	0.00001	0.0004
March	0	0	0	-0.0055
Total	963	0.17	0.9534	0.450
% Contribution		10.7	60.1	29.2

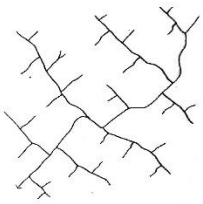


Monthly variation of rainfall and change in storage volume of Renuka Lake, which recieves an average rainfall of **250 to 300mm** rainfall and 400mm at the peak time which is during August.



WATER RECIEVED BY THE LAKE

DRAINAGE PATTERN



Trellis drainage pattern

Trellis drainage pattern is formed when the primary tributaries of main rivers flow parallel to each other and secondary tributaries join them at right angles. For example, rivers in the part of the Himalayan region.

Trellis patterns are **modified dendritic forms** with parallel tributaries and short parallel gullies occuring at right angles.This pattern indicates a bedrock structure rather than a type of bedrock and usually indicated **tilted, interbedded, sedimentary rocks** in which the main, parallel channels follow the strike of beds.

HYDROGEOLOGICAL CHARACTERISTICS

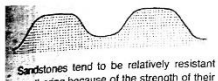
The region is mainly composed of Sedimentary rocks (sandstone, limestone,shale etc.) thus the sub surface flows in the region behaves in a certain way.

Sandstone

Sandy -loam residual soils developed in humid climates provide **good initial surface drainage** which is augmented by high internal drainage capacity of the bedrock,**low soil depths** are available in these areas because of the rocky strata.

Topography

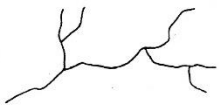
Steep slopes



Sandstones tend to be relatively resistant to weathering because of the strength of their cementing agents. Therefore, in humid climates they produce a massive, bold topography with steep sideslopes. The residual soils tend to be very shallow along the ridgelines but thicker at lower elevations, owing to the accumulation of colluvium. Since sandstone is usually the most resistant sedimentary rock in humid climates, it tends to occur as an overlying cap rock. Where sandstones encounter other sedimentary rocks, there is generally a sharp boundary.

Drainage

Dendritic: Coarse



In humid climates the drainage pattern for sandstones is generally dendritic although, depending on the influence of the jointing pattern, it may also be somewhat angular or even rectangular. The drainage system texture is usually coarse but may also be medium, with minor tributaries joining the next higher stream order at right angles.

Tone

Light

The photographic tones are light because both the landform and the residual soils are well drained. Banding indicates bedding planes of other sedimentary deposits.

Gullies

Few, V-shaped

Few gullies are observed because of the porosity of the soil and rock, which decreases runoff. Any gullies present are V-shaped.

Vegetation and land use

Forested

Sandstone regions in humid climates do not develop residual soils of sufficient depth or nutrient value for intensive agricultural use. Because of the rugged topography and soil conditions, the land is covered with forests with little ground cover. The forest cover, if undisturbed, tends to be uniform, reflecting the uniformity of composition of the residual soils. Major changes in vegetative associations are found along hillsides, where there are different climatic conditions and orientation. Since major valleys in such regions have deeper soils and greater available moisture, they may be in agricultural use. Settlement patterns and circulation systems tend to follow the major valley

Shale

Soil **internal drainage** in shale region is **slow** because of fine textural composition of the residual soils. The depth of the **soil cover** in humid climates are **higher at lower slope hills** where materials have been transported downslope by erosion.

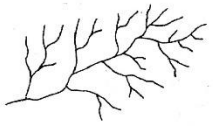
Topography

Soft Hills

A smooth, sag-and-swale topography occurs, appearing as soft hills and mounds. Sharp breaks in slopes are neither common nor stable. The attitude of the bedding layers does not affect the appearance of the topography, and it is difficult to observe bedding planes, because of the deep soil profiles found in this climatic zone.

Drainage

Dendritic: Medium to fine



The soft materials exert no control over the drainage system, allowing a medium to fine dendritic pattern to develop freely. No angularity is found, and tributaries enter streams of the next order at acute angles.

Tone

Mottled, dull

The fine cohesive materials comprising the residual soils show as dull gray tones with some mottling. The mottling is caused by slight differences in moisture and organic content.

Gullies

Sag and swale

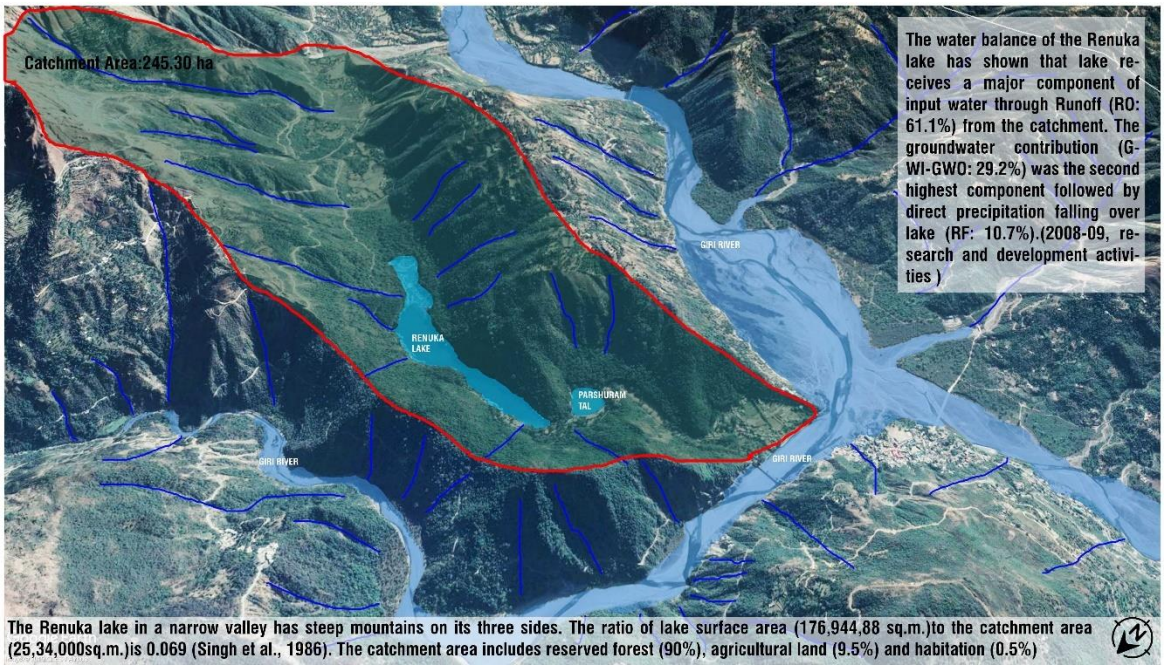
Gentle sag-and-swale type gullies are common, reflecting the cohesive nature of the residual soils.

Vegetation and land use

Cultivated

Humid climate shale regions are either intensely cultivated or heavily forested, depending upon the slopes and the depth of the residual soil cover. In cultivated areas the steeper sideslopes tend to be left in forest cover, thus emphasizing the dendritic pattern. Field patterns are generally square or rectangular, becoming irregular only if drainage courses are intersected. Highways are usually in gridded form unless major drainage systems are encountered, when they become curvilinear.

Source: Terrain Analysis_Douglas S. Way



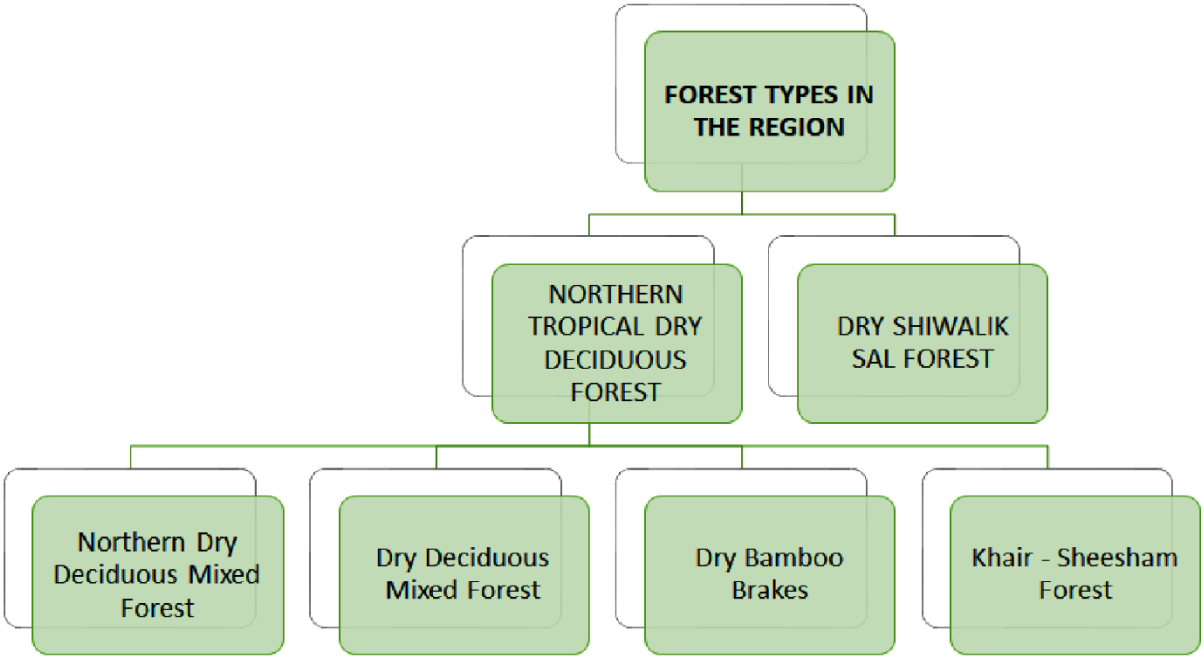
The Renuka lake in a narrow valley has steep mountains on its three sides. The ratio of lake surface area (176,944,88 sq.m.)to the catchment area (25,34,000sq.m.)is 0.069 (Singh et al., 1986). The catchment area includes reserved forest (90%), agricultural land (9.5%) and habitation (0.5%)

5.4 Ecological attributes

5.4.1 Vegetation

5.4.1.1 Forest type and classification

Due to a wide range of topography, altitudes, soils and climate, the district's vegetation is diversified. The altitude of the area varies from 600-2100 m amsl and the vegetation type is northern subtropical dry mixed deciduous forests 5B/C2 and dry deciduous scrub 5B/DS1 (Champion and Seth, 1968; Singh et al., 1990).



Tropical forests (up to 1,000 m): This type of forest is represented as the dominant species by Introduction 5 of moist Sal (Shorea robusta). Other partners are Acacia catechu, Aegle marmelos, Bauhinia vahlii, Bombax ceiba, Dalbergia sissoo, Diospyros montana, Terminalia bellirica, etc. Naringi crenulata, Caesalpinia bonduc, Woodfordia fructicosa, and so on are common shrubs. Anagallis arvensis, Atylosia scarabaeoides, Crotalaria medicaginea, Fumaria indica, etc. are the common herbaceous plants seen here.

Seasonal vegetation: includes all annual herbs as well as perennials that sprout during different seasons of the year from their underground parts. Herbaceous flora makes up approximately 68.78% of the total vegetation.

Arenaria serpyllifolia, Biden bipinnata, Cleome gynandra, C.viscosa, Desmodium microphyllum, Nasturtium officinale, Poa annua, Solanum nigrum, Spergula fallax, Stellaria media, etc.

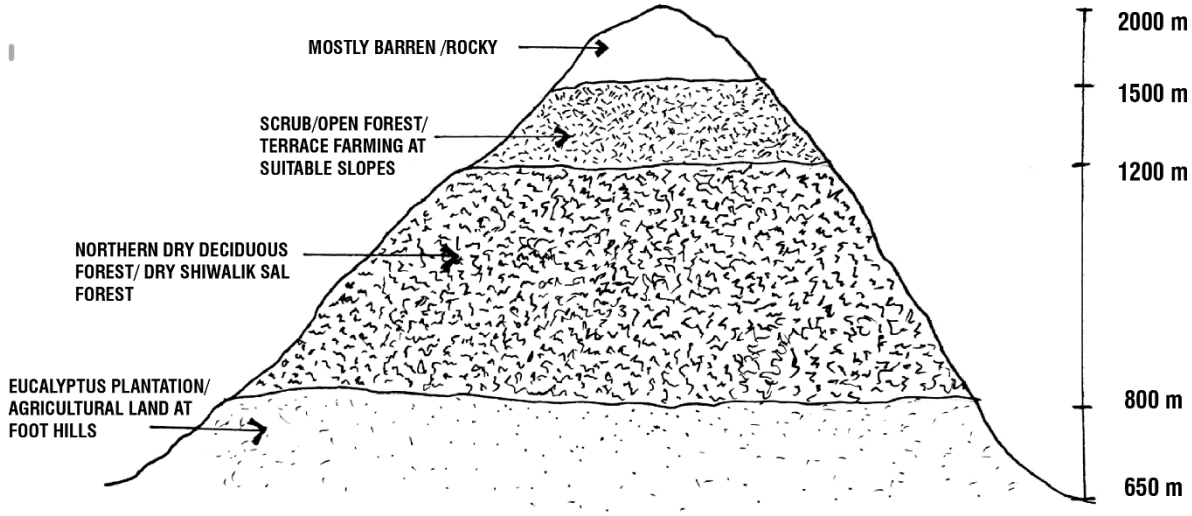
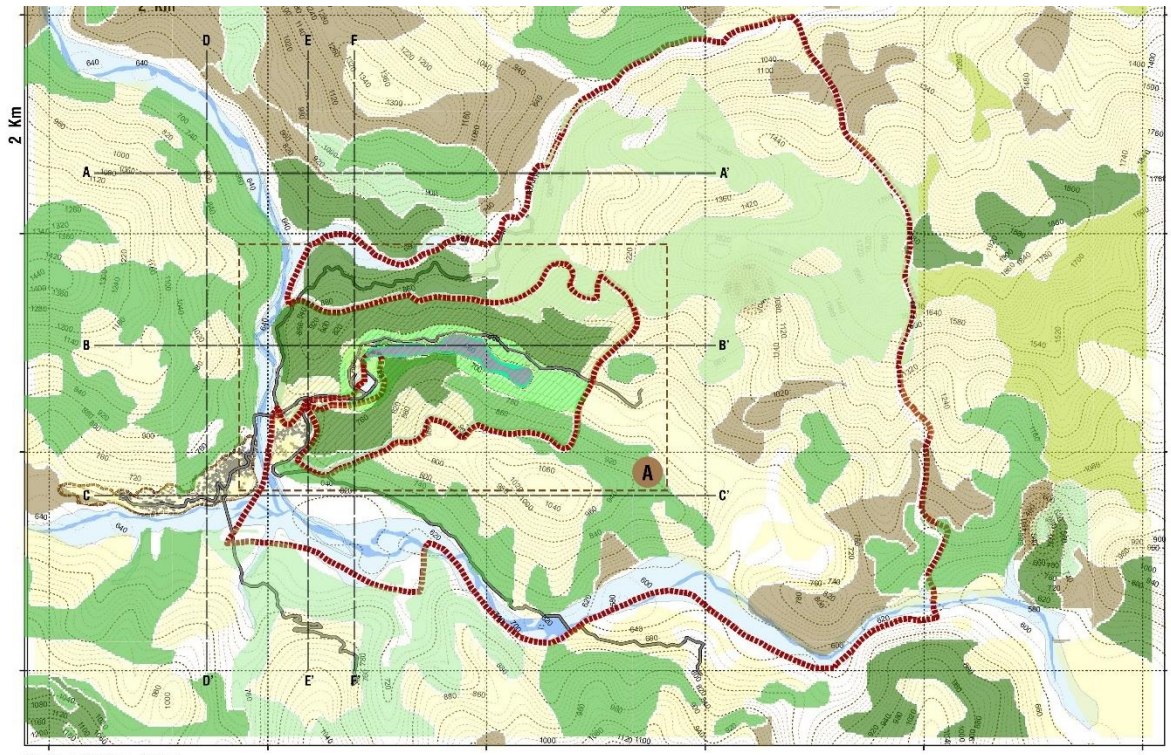


Figure 31: Vertical Zonation of Vegetation

The sanctuary covers an area which marks the northern most boundaries with the old natural Sal forests, where Sal is found as endemic Species mixed with all its major associates, and mostly miscellaneous broad-leaved species, which is mostly dry deciduous, such as Khair, Shisam, Amaltas. The area, therefore gains significance in maintaining the biodiversity of the fragile ecosystem and in conserving the gene pool of Sal and its associates along with mixed miscellaneous species like Beil, Khair, Amaltas, Shisam, Kachnar, Anzir etc.

The aspect and the edaphic factors play the significant role of supporting the vegetation whereas the biotic factors lead to degeneration stages of the forest . The parts of Nohra, Sangrah and Renuka ranges face the southern aspect which being warmer, is dry and the portions facing the northern aspect are moist and support ban, fir, spruce and deodar forests. The Shillai and Kafota ranges are rich in limestone and portions of this edaphic site support Khair, Shisham, and mixed deciduoud forests with Terminalias and Anogeissus as the main species. These are exposed to southern slopes of Shiwalik ridge and is exposed to periodical dry spells.
The slopes are fairly steep and the soils are shallow and sandy with pockets of clay.



VEGETATION MAP

0 0.5 1 2 Km

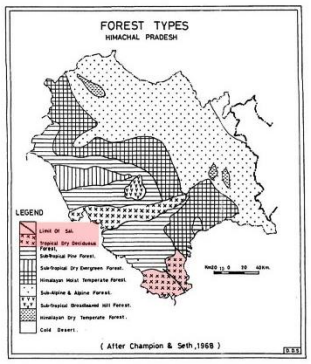
GRID SIZE : 2 X 2 Km

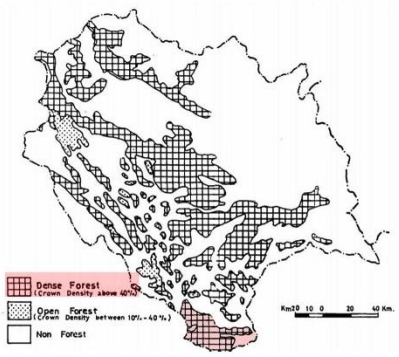
LEGEND

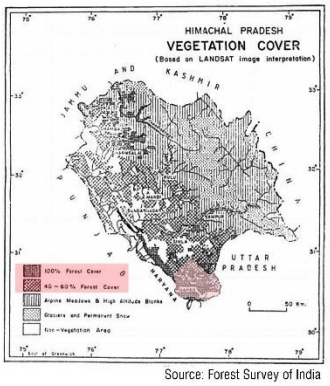
- RENUKA JI FOREST BOUNDARY
- WILDLIFE SANCTUARY BOUNDARY
- ROADS
- VILLAGE BOUNDARY
- BUILT UP

FOREST COVER

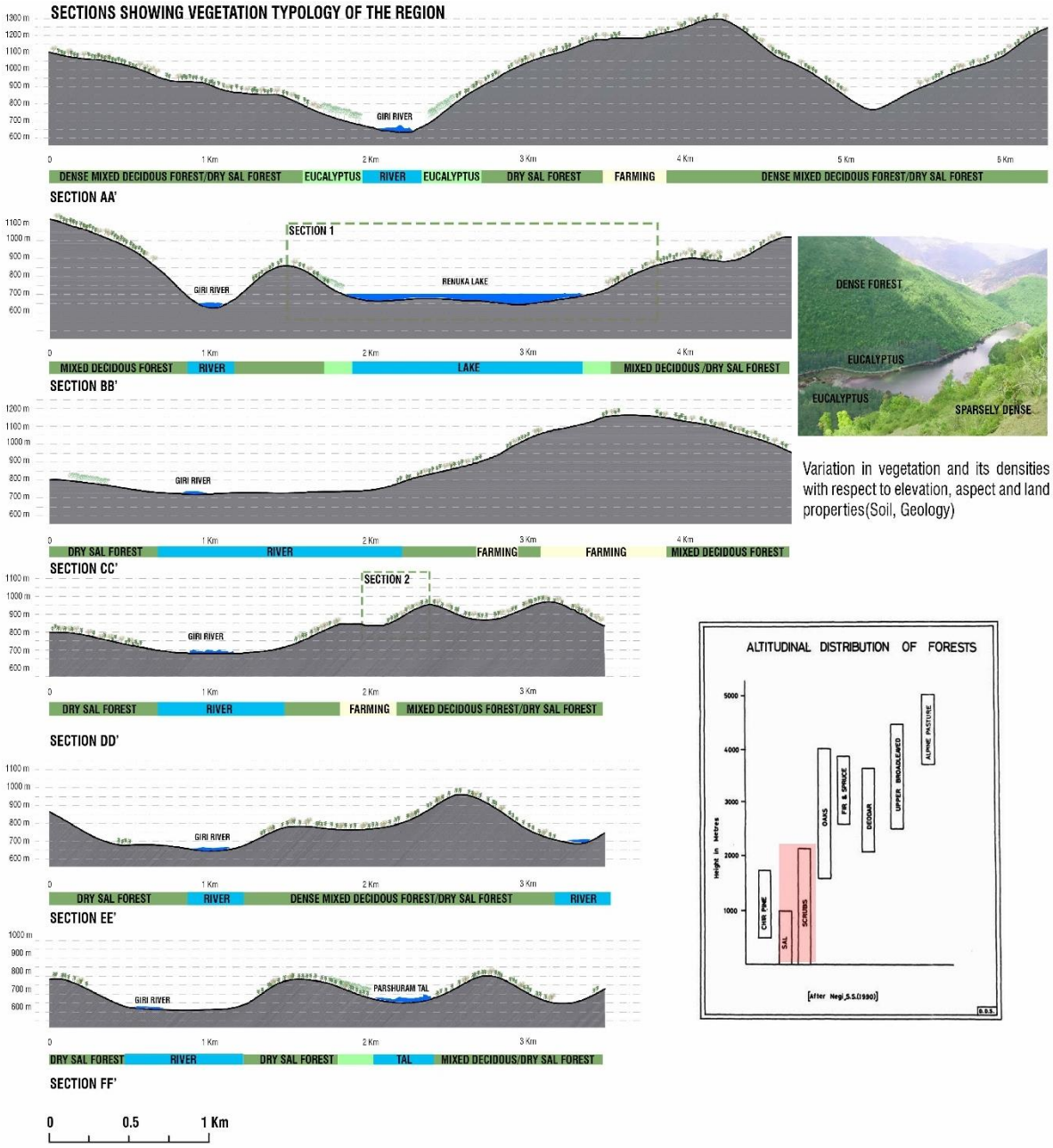
- MINOR CONTOURS
- MAJOR CONTOURS
- GIRI RIVER
- RENUKA LAKE
- LAKE EDGE SPECIES
- EUCALYPTUS PLANTATION
- DRY MIXED DECIDUOUS /SHI-WALIK SAL FOREST
- DRY MIXED DECIDUOUS/DRY SHI-WALIK SAL FOREST
- SCRUB FOREST
- GRASS/GRAZING
- AGRICULTURAL LAND
- BARREN/ROCKY/NO VEGETATION





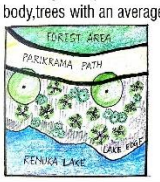
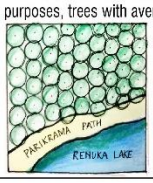
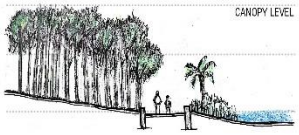
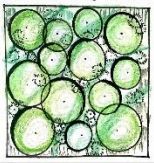
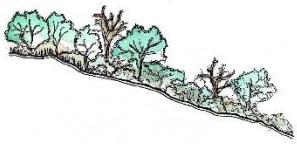
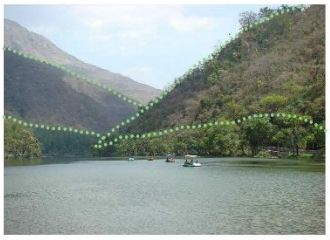
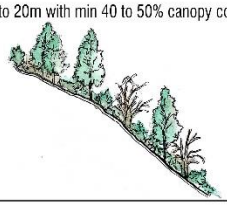


Source: Forest Survey of India

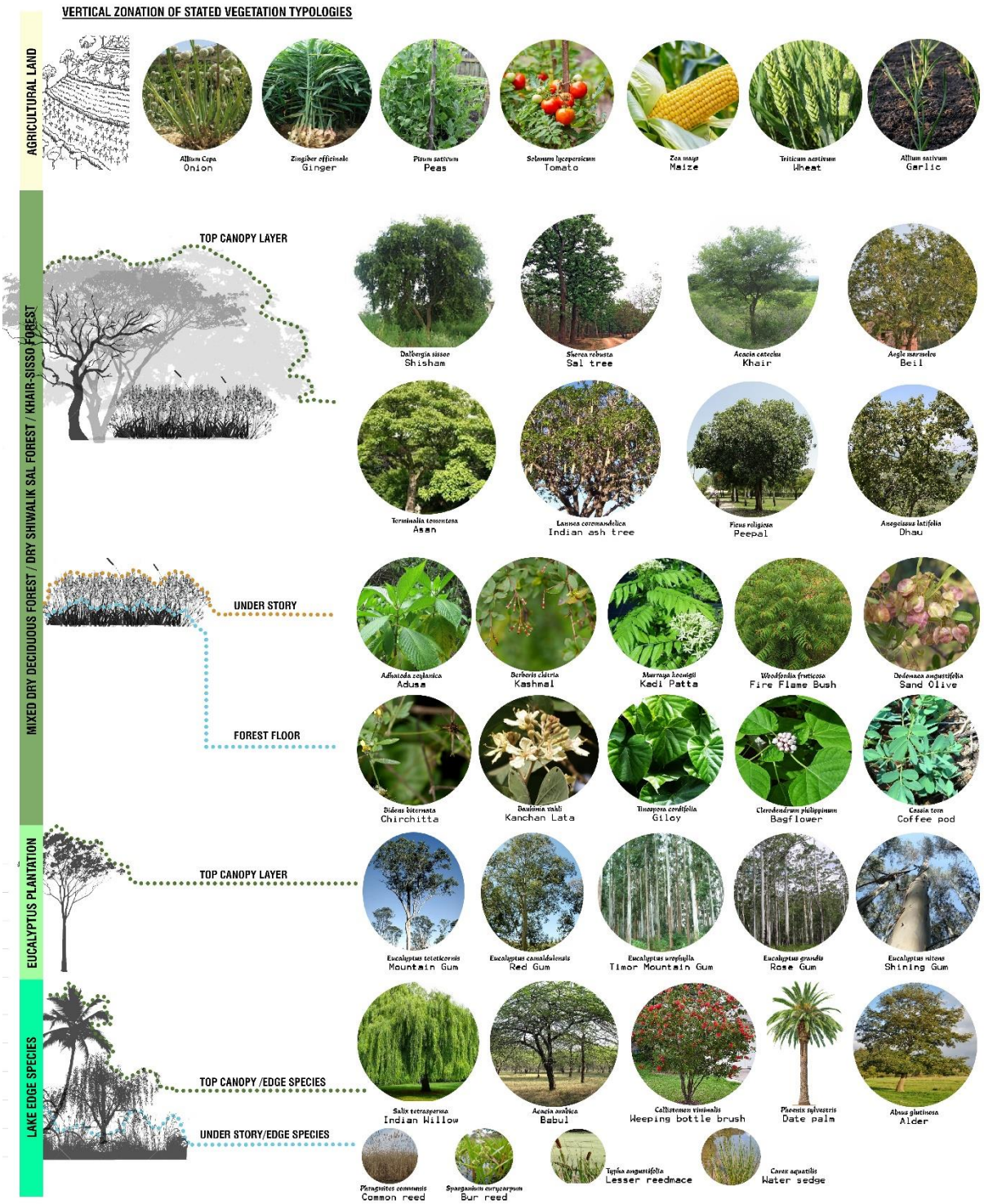


Variation in vegetation and its densities with respect to elevation, aspect and land properties(Soil, Geology)

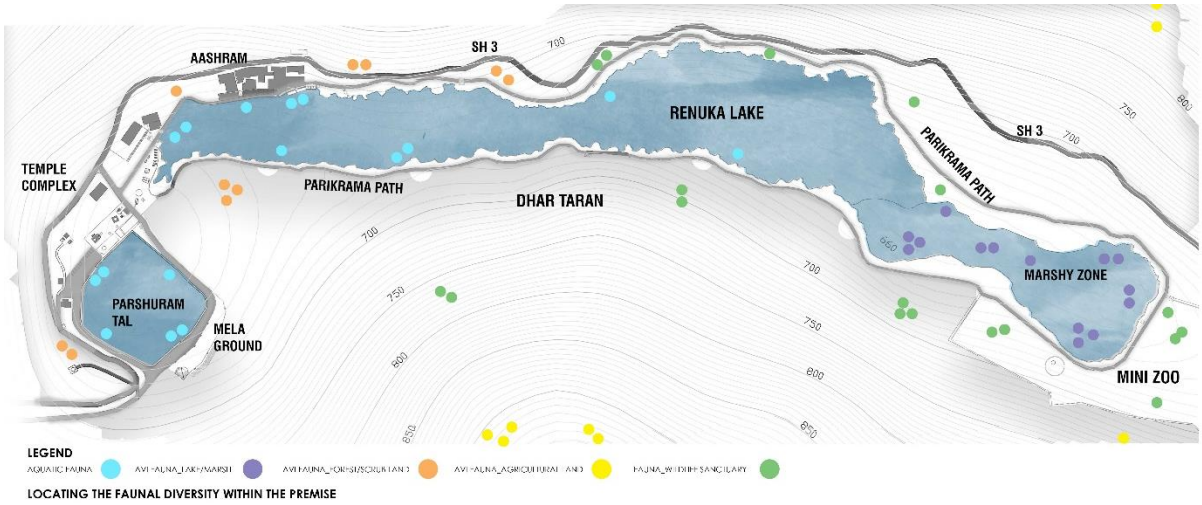
TYPES AND CHARACTERISTICS OF VEGETATION IN THE REGION

VEGETATIVE STRUCTURE	PLANT TYPES	SITE AND HABITAT
1 LAKE EDGE SPECIES Generally low plant cover and more grasses along the edges of the water-body,trees with an average height of 3-4m and grasses upto 1.5m  	The vegetation along the lake shore comprise mainly of : **Trees** like **Acacia arabica, Cassia auriculata, Populus deltoides, Phoenix sylvestris,Callistemon lanceolatus** **Shrubs** like **Rosa indica, Citrus medica** etc. The shallow zones on either sides of lake have emergent and free floating **macrophytic vegetation**	
2 FOREST PLANTATION Densely planted Eucalyptus trees along the lake and tal edge for afforestation purposes, trees with average height of 30-40m and 70-80% canopy cover  	The area along the parikrama path is planted with Eucalyptus trees, also a backdrop of Eucalyptus trees are planted in Mela ground which is in front of Parshuram Tal : **Eucalyptus tereticornis** **Eucalyptus camaldulensis** **Eucalyptus urophylla** **Eucalyptus grandis** **Eucalyptus nitens**	
3 DENSE DRY DECIDUOUS FOREST Trees with average height of 20 to 25m with min 50 to 70% canopy cover, with moderately dense in certain areas  	It comprises mainly of sub-tropical vegetation: **Trees**: Bambusa arundinacea, Shorea robusta, Acacia catechu, Anogeissus latifolia **Shrubs:** Adhatoda vasica, Carissa opaca, Dodonaea viscora, Euphorbia royleana, Lantana camara,Murraya koenigii, Woodfordia fruticosa **Grasses**: Aristida depressa, Botherlochloa intermedia, Cynodon dactylon,Eulalioposis binata, Hetropogon controtus, Themeda anathera **Climbers**: Abrus precatorius, Bauhenia vahlii, Caesalpinia sepiaria, Cissampelos pareira, Clematis gouriana, Cryptolepis buchanani, Zizyphiusoenoplia	
4 DRY SHIWALIK SAL FOREST Trees with average height of 15 to 20m with min 40 to 50% canopy cover  	**Trees:** Shorea robusta,Acacia catechu,Terminalia tomentosa,Anogeissus latifolia, Dalbergia sissoo **Shrubs:** Randia dumetorum, Murraya koenigii, Carrisa carandus **Herbs:** Bidens pilosa,Cassia tora, Achyranthus aspera	
5 AGRICULTURAL LAND Agricultural practices are strategically placed at suitable slopes and direction of slopes, which is practiced with certain crops and cropping patterns in the region. 	**Agricultural land**, the cultivation of : Triticum aestivum(Wheat), Zingiber officinalis(Ginger), Colocasia esculanta(Kachalu), Brassica compestris(Mustard) and Allium Cepa(Onion) is mainly being practiced.	

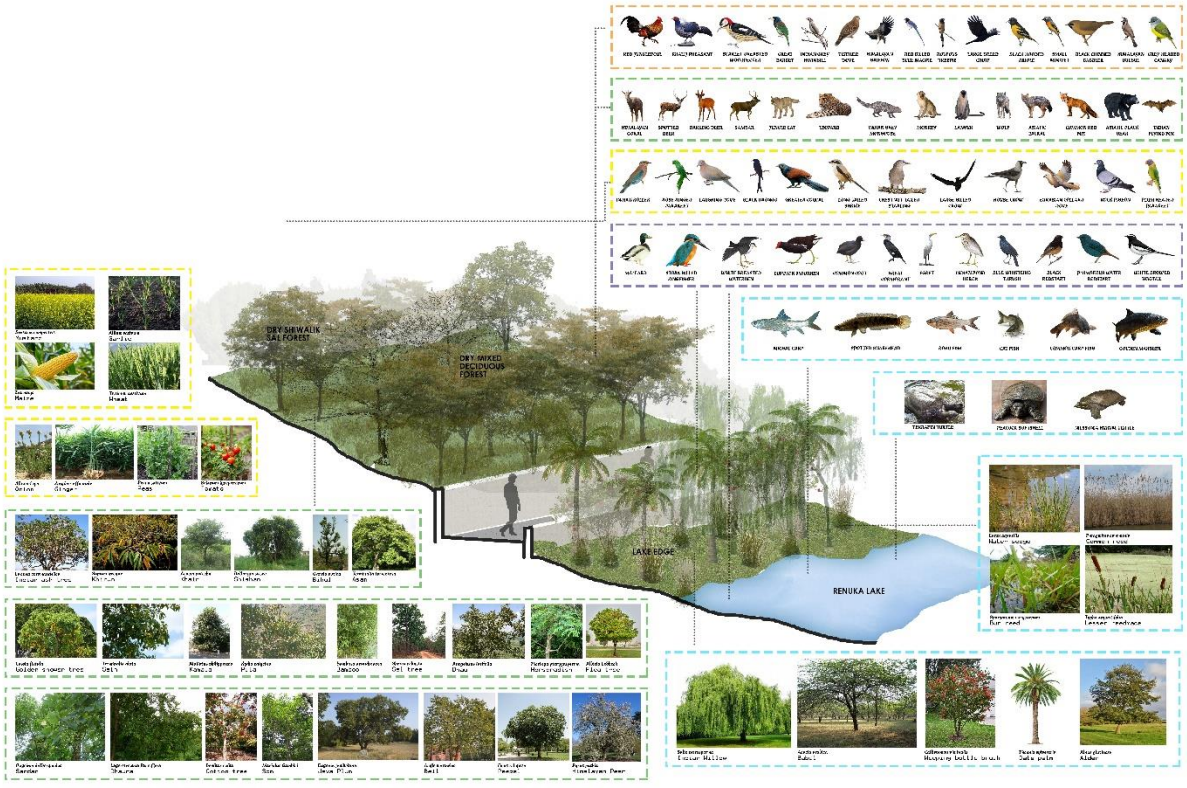
PLANT TYPE SOURCE:FLORISTIC COMPOSITION, LIFE-FORMS AND BIOLOGICAL SPECTRUM OF RENUKA WILDLIFE SANCTUARY, HIMACHAL PRADESH
S.P. SUBRAMANI, VANEET JISHTU, R.K. VERMA AND K.S. KATOCH
Himalayan Forest Research Institute, Conifer Campus, Panthaghati, Shimla (Himachal Pradesh).


VERTICAL ZONATION OF STATED VEGETATION TYPOLOGIES
AGRICULTURAL LAND
Allium Cepa
Onion
Zingiber officinale
Ginger
Pisum sativum
Peas
Solanum lycopersicum
Tomato
Zea mays
Maize
Triticum aestivum
Wheat
Allium sativum
Garlic
MIXED DRY DECIDUOUS FOREST / DRY SHIWALIK SAL FOREST / KHAIR-SISSO FOREST
TOP CANOPY LAYER
Dalbergia sissoo
Shisham
Shorea robusta
Sal tree
Acacia catechu
Khair
Aegle marmelos
Beil
Terminalia tomentosa
Asan
Lannea coromandelica
Indian ash tree
Ficus religiosa
Peepal
Anogeissus latifolia
Dhau
UNDER STORY
FOREST FLOOR
Adhatoda zeylanica
Adusa
Berberis chitria
Kashmal
Murraya koenigii
Kadi Patta
Woodfordia fruticosa
Fire Flame Bush
Dodonaea angustifolia
Sand Olive
Bidens biternata
Chirchitta
Bauhinia vahli
Kanchan Lata
Tinospora cordifolia
Giloy
Clerodendrum philippinum
Bagflower
Cassia tora
Coffee pod
EUCALYPTUS PLANTATION
TOP CANOPY LAYER
Eucalyptus tetoticornis
Mountain Gum
Eucalyptus camaldulensis
Red Gum
Eucalyptus urophylla
Timor Mountain Gum
Eucalyptus grandis
Rose Gum
Eucalyptus nitens
Shining Gum
LAKE EDGE SPECIES
TOP CANOPY /EDGE SPECIES
UNDER STORY/EDGE SPECIES
Salix tetrasperma
Indian Willow
Acacia arabica
Babul
Callistemon viminalis
Weeping bottle brush
Phoenix sylvestris
Date palm
Alnus glutinosa
Alder
Phragmites communis
Common reed
Sparganium eurycarpum
Bur reed
Typha angustifolia
Lesser reedmace
Carex aquatilis
Water sedge

5.4.2 Faunal Diversity



LOCATING THE FAUNAL DIVERSITY WITHIN THE PREMISE



HABITAT	COMMON NAME		SEASONAL STATUS	RELATIVE ABUNDANCE	STATUS(MIGRATORY/FREQUENT)	FOOD HABIT
LAKE	Gadwall		WINTER	COMMON	MIGRATORY	AQUATIC ANIMALS ,GRANIVORUS AND INSECTIVORUS
	Mallard		WINTER	COMMON	MIGRATORY AND OCCASIONAL	OMNIVOROUS, FRUGIVORUS,GRAMINIVORORS ,GRANIVOROUS
	Stork-billed Kingfisher		WINTER	RARE		CARNIVOROUS
	White-throated Kingfisher		SPRING/WINTER	VERY COMMON		CARNIVOROUS
	White-breasted Waterhen		SPRING/WINTER	COMMON		INSECTIVORUS
	Common Moorhen		SPRING/WINTER	VERY COMMON		AQUATIC PLANTS AND ANIMALS AND INSECTIVORUS
	Common Coot		WINTER	COMMON		OMNIVOROUS
	Great Cormorant		WINTER	UNCOMMON	LOW MIGRATORY AND ABUNDANT	AQUATIC ANIMALS AND INSECTIVORUS
	Little Egret		SPRING/WINTER	COMMON	RESIDENT AND COMMON	AQUATIC ANIMALS AND INSECTIVORUS
	Intermediate Egret		SPRING/WINTER	COMMON	RESIDENT AND COMMON	AQUATIC ANIMALS AND INSECTIVORUS
	Indian Pond Heron		SPRING/WINTER	COMMON	RESIDENT AND COMMON	AQUATIC ANIMALS AND INSECTIVORUS
	Blue Whistling Thrush		SPRING/WINTER	COMMON		AQUATIC ANIMALS AND INSECTIVORUS
	Black Redstart		SPRING	UNCOMMON	RESIDENT AND OCCASIONAL	FRUGIVOROUS AND INSECTIVORUS
	White-capped Water Redstart		SPRING/WINTER	COMMON	RESIDENT AND COMMON	INSECTIVORUS AND GRAMINIVORUS
	Plumbeous Water Redstart		SPRING/WINTER	COMMON	RESIDENT AND COMMON	INSECTIVORUS
	White Wagtail		SPRING/WINTER	COMMON	RESIDENT AND COMMON	INSECTIVORUS
	White-browed Wagtail		SPRING/WINTER	COMMON		INSECTIVORUS
	Red Junglefowl		SPRING/WINTER	COMMON		OMNIVOROUS AND GRAMINIVORUS
	Kalij Pheasant		SPRING/WINTER	UNCOMMON		OMNIVOROUS
	Grey-capped Pygmy Woodpecker		SPRING/WINTER	UNCOMMON		INSECTIVORUS

Fulvous-breasted Woodpecker		WINTER	UNCOMMON		INSECTIVORUS
Lesser Yellownape		WINTER	UNCOMMON		INSECTIVORUS
Black-rumped Flameback		WINTER	COMMON		INSECTIVORUS
Greater Flameback		SPRING/WINTER	SCARCE /RARE		NECTAR EATER AND INSECTIVORUS
Great Barbet		SPRING/WINTER	SCARCE /RARE		FRUGIVOROUS
Brown-headed Barbet		SPRING	UNCOMMON	RESIDENT AND ABUNDANT	FRUGIVOROUS
Indian Grey Hornbill		SPRING	COMMON	RESIDENT AND ABUNDANT	FRUGIVOROUS AND INSECTIVORUS
Green Bee-eater		SPRING	COMMON	RESIDENT AND ABUNDANT	INSECTIVORUS
Rock Pigeon		SPRING/WINTER	VERY COMMON	RESIDENT AND ABUNDANT	GRAMINIVORUS
Oriental Turtle Dove		SPRING	UNCOMMON		GRANIVORUS
Laughing Dove		SPRING	UNCOMMON		
Spotted Dove		SPRING/WINTER	VERY COMMON	RESIDENT AND COMMON	GRAMINIVORUS
Emerald Dove		WINTER	SCARCE /RARE		GRANIVORUS AND FRUGIVOROUS
Yellow-footed Green		SPRING	UNCOMMON		FRUGIVOROUS
White-rumped Vulture		SPRING/WINTER	UNCOMMON		SCAVENGER
Himalayan Griffon		SPRING/WINTER	UNCOMMON	RESIDENT AND COMMON	SCAVENGER
Crested Serpent Eagle		SPRING	SCARCE /RARE		CARNIVOROUS
Shikra		SPRING	UNCOMMON	RESIDENT AND COMMON	CARNIVOROUS

	Red-billed Blue Magpie		SPRING/WINTER	COMMON	OMNIVOROUS
	Rufous Treepie		SPRING/WINTER	COMMON	INSECTIVOROUS
	Large-billed Crow		SPRING/WINTER	VERY COMMON	OMNIVOROUS AND SCAVENGER
	Black-hooded Oriole		SPRING	UNCOMMON	FRUGIVOROUS
	Small Minivet		SPRING	COMMON	INSECTIVOROUS
Forest	Long-tailed Minivet		WINTER	UNCOMMON	INSECTIVOROUS
	Yellow-bellied Fantail		WINTER	UNCOMMON	INSECTIVOROUS
	White-throated Fantail		SPRING/WINTER	UNCOMMON	INSECTIVOROUS
	Ashy Drongo		SPRING/WINTER	COMMON	INSECTIVOROUS AND NECTAR EATER
	Common Woodshrike		SPRING/WINTER	UNCOMMON	INSECTIVOROUS
	Blue Whistling Thrush		SPRING/WINTER	COMMON	INSECTIVOROUS
	Orange-headed Thrush		SPRING/WINTER	UNCOMMON	INSECTIVOROUS ,FRUGIVOROUS AND GRAMINIVOROUS
	Scaly Thrush		SPRING/WINTER	COMMON	INSECTIVOROUS
	Tickell's Thrush		WINTER	UNCOMMON	INSECTIVOROUS AND FRUGIVOROUS
	Grey-winged Blackbird		SPRING	UNCOMMON	INSECTIVOROUS
	Rufous-gorgeted Flycatcher		WINTER	SCARCE /RARE	INSECTIVOROUS
Forest	Rufous-bellied Niltava		SPRING	UNCOMMON	INSECTIVOROUS
	Grey-headed Canary Flycatcher		SPRING/WINTER	UNCOMMON	INSECTIVOROUS

	White-rumped Shama		SPRING	SCARCE /RARE		INSECTIVOROUS
	Blue-capped Redstart		WINTER	UNCOMMON		FRUGIVOROUS AND INSECTIVOROUS
	Chestnut-bellied Nuthatch		SPRING	UNCOMMON		FRUGIVOROUS AND INSECTIVOROUS
	Bar-tailed Treecreeper		SPRING/WINTER	UNCOMMON		INSECTIVOROUS
	Great Tit		SPRING/WINTER	VERY COMMON		FRUGIVOROUS AND INSECTIVOROUS
	Himalayan Bulbul		SPRING/WINTER	VERY COMMON		FRUGIVOROUS
	Red-vented Bulbul		SPRING/WINTER	VERY COMMON		FRUGIVOROUS AND NECTAR EATER
	Black Bulbul		SPRING/WINTER	UNCOMMON		FRUGIVOROUS AND NECTAR EATER
	Oriental White Eye		SPRING/WINTER	VERY COMMON	RESIDENT AND OCCASIONAL	INSECTIVOROUS,FRUGIVOROUS AND NECTAR EATER
	Grey-hooded Warbler		SPRING/WINTER	VERY COMMON		INSECTIVOROUS
	Rusty-cheeked Scimitar Babbler		SPRING/WINTER	UNCOMMON		FRUGIVOROUS AND INSECTIVOROUS
	Black-chinned Babbler		SPRING/WINTER	COMMON		INSECTIVOROUS AND FRUGIVOROUS
	Jungle Babbler		SPRING/WINTER	VERY COMMON	RESIDENT AND ABUNDANT	INSECTIVORUS
	White-capped Bunting		SPRING	UNCOMMON		GRAMINIVOROUS, INSECTIVOROUS AND FRUGIVOROUS
	Indian Roller		SPRING/WINTER	UNCOMMON	RESIDENT AND COMMON	INSECTIVORUS
	Rose-ringed Parakeet		SPRING/WINTER	COMMON	RESIDENT AND ABUNDANT	FRUGIVOROUS
	Plum-headed Parakeet		SPRING/WINTER	COMMON	RESIDENT AND COMMON	FRUGIVOROUS
Agricultural Land	Rock Pigeon		SPRING/WINTER	VERYCOMMON	RESIDENT AND ABUNDANT	GRAMINIVORUS
	Laughing Dove		SPRING	UNCOMMON		FRUGIVOROUS AND GRANIVOROUS
	Eurasian Collared Dove		SPRING	COMMON		FRUGIVOROUS, GRAMINIVOROUS AND GRANIVOROUS
	House Crow		SPRING/WINTER	COMMON	RESIDENT AND ABUNDANT	OMNIVORUS

	Large-billed Crow		SPRING/WINTER	VERY COMMON		OMNIVOROUS AND SCAVENGER
	Black Drongo		SPRING/WINTER	VERY COMMON		OMNIVORUS
	Chestnut-tailed Starling		SPRING	UNCOMMON		INSECTIVOROUS, NECTAR EATER ,FRUGIVOROUS
	Indian Roller		SPRING	UNCOMMON	RESIDENT AND COMMON	INSECTIVORUS
	Greater Coucal		SPRING/WINTER	UNCOMMON		CARNIVOROUS
	Eurasian Collared Dove		SPRING	COMMON		FRUGIVOROUS, GRAMINIVOROUS AND GRANIVOROUS
	Bay-backed Shrike		SPRING	SCARCE /RARE		INSECTIVORUS
	Long-tailed Shrike		SPRING/WINTER	COMMON		INSECTIVORUS
	Large-billed Crow		SPRING/WINTER	VERY COMMON		OMNIVOROUS AND SCAVENGER
	Black Drongo		SPRING/WINTER	VERY COMMON	RESIDENT AND COMMON	OMNIVORUS
	White-tailed Rubythroat		WINTER	UNCOMMON		INSECTIVORUS
	Bluethroat		WINTER	UNCOMMON		FRUGIVORUS
	Indian Robin		SPRING/WINTER	COMMON		INSECTIVORUS
	Common Stonechat		SPRING/WINTER	COMMON		FRUGIVORUS AND INSECTIVOROUS
Scrubland	Pied Bushchat		SPRING	COMMON		INSECTIVORUS
	Laughing Dove		SPRING	UNCOMMON		FRUGIVOROUS AND GRANIVOROUS
	Grey Bushcat		WINTER	COMMON		INSECTIVORUS
	Brahminy Starling		SPRING/WINTER	COMMON	RESIDENT AND COMMON	INSECTIVORUS,FRUGIVOROUS AND NECTAR EATER
	Common Myna		SPRING/WINTER	VERY COMMON	RESIDENT AND ABUNDANT	INSECTIVORUS AND OMNIVOROUS
	Great Tit		SPRING/WINTER	VERY COMMON		GRAMINIVOROUS AND INSECTIVOROUS

Himalayan Bulbul		SPRING/WINTER	VERY COMMON		FRUGIVOROUS
Red-vented Bulbul		SPRING/WINTER	VERY COMMON		FRUGIVOROUS AND NECTAR EATER
Grey-breasted Prinia		SPRING/WINTER	COMMON		INSECTIVORUS
Yellow-eyed Babbler		SPRING	COMMON		INSECTIVORUS AND FRUGIVORUS
Common Babbler		SPRING	COMMON	RESIDENT AND ABUNDANT	INSECTIVORUS
Jungle Babbler		SPRING/WINTER	VERY COMMON	RESIDENT AND ABUNDANT	INSECTIVORUS
Purple Sunbird		SPRING	UNCOMMON	RESIDENT AND ABUNDANT	NECTAR EATER

Figure 32: Avi Fauna of the region

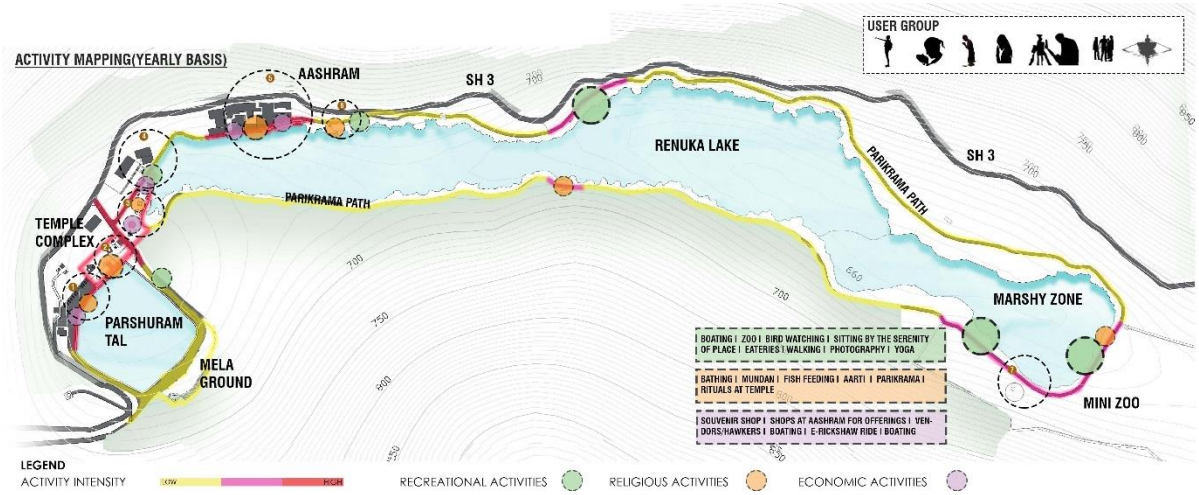
5.5 Cultural attributes

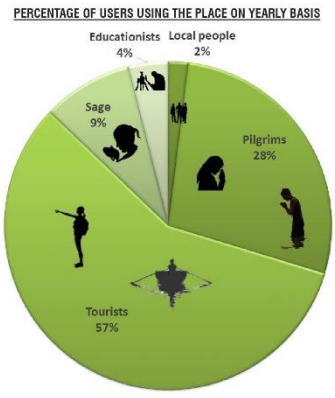
5.5.1 Activity Mapping

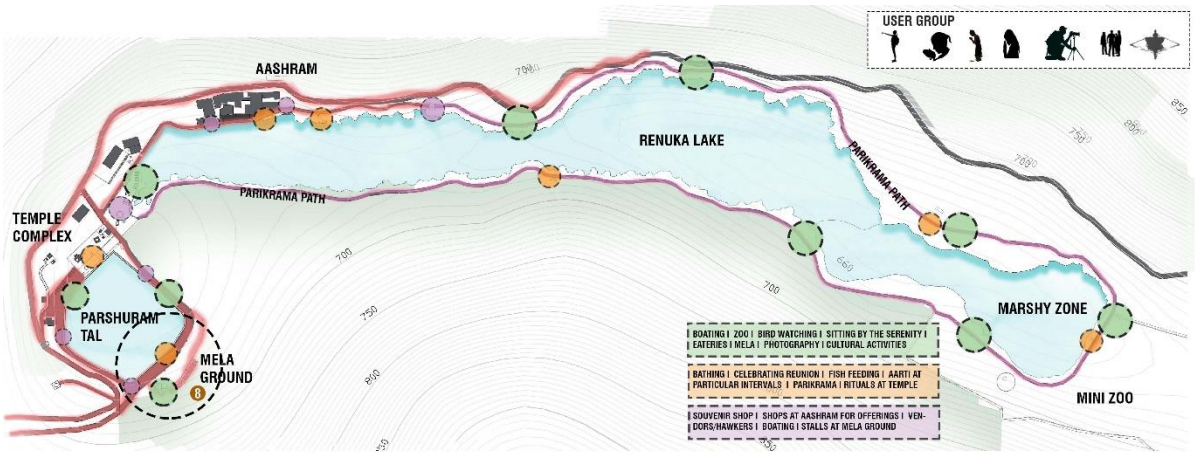
The activities of the place vary season wise; the mapping is done on 2 basis:

Yearly basis
During annual fair

There are major differences in the footfall and the way these spaces are being at these two broadly classified times of the year.

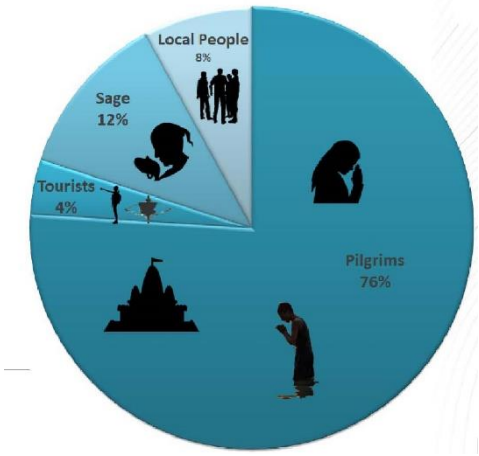




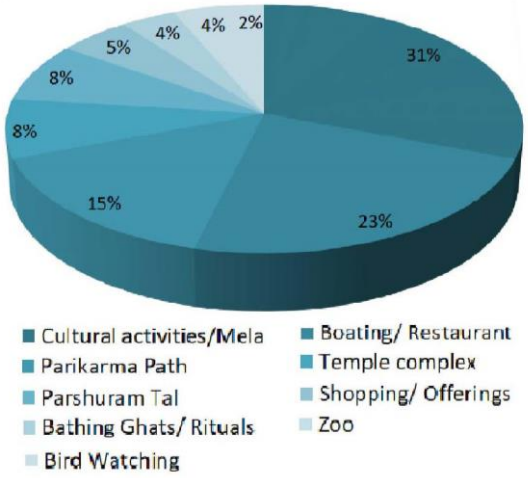


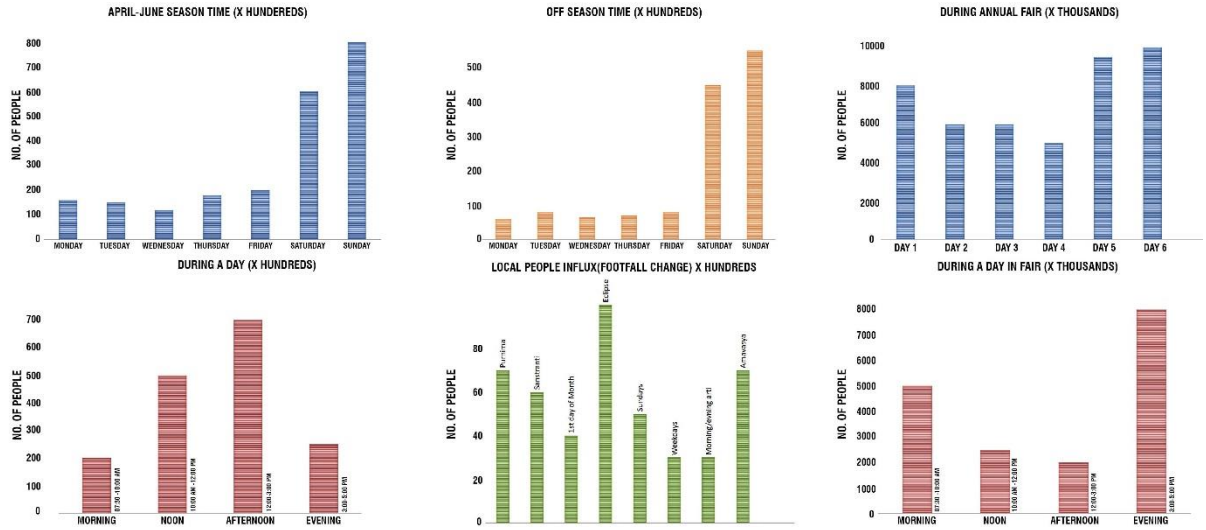
ACTIVITY MAPPING(ANNUAL FAIR)

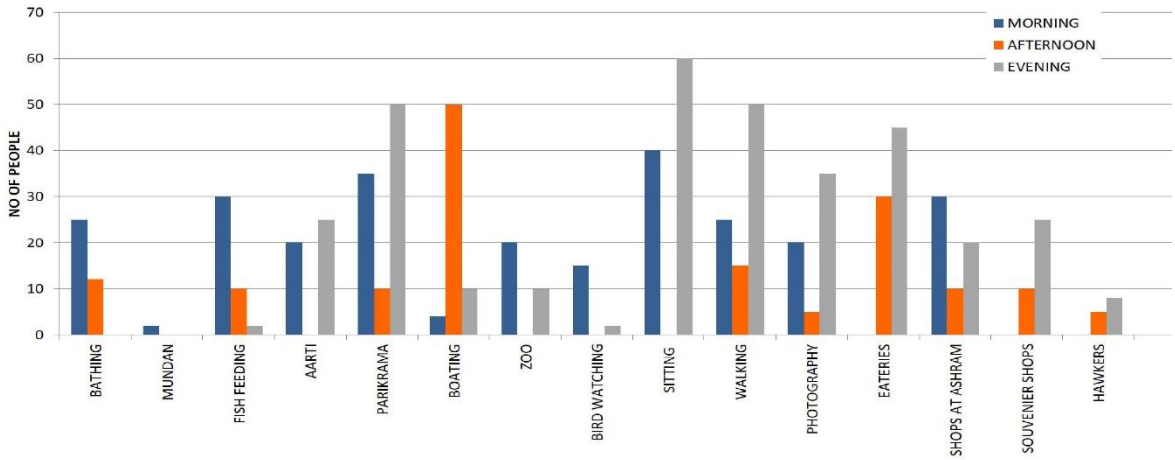
PERCENTAGE OF USERS USING THE PLACE DURING ANNUAL FAIR



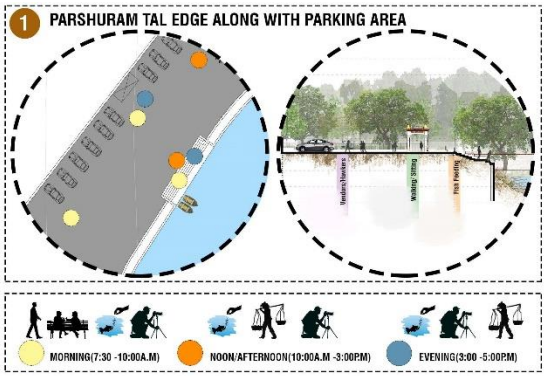
PERCENTAGE OF TIME SPENT FOR DIFFERENT ACTIVITIES

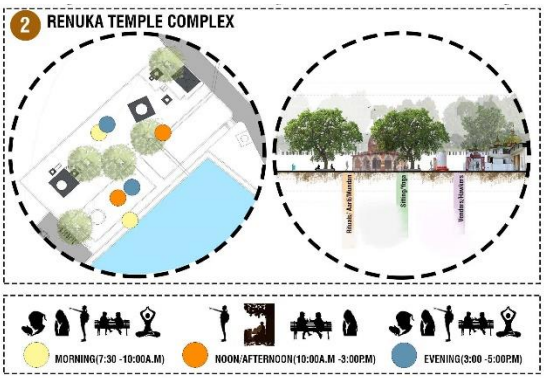


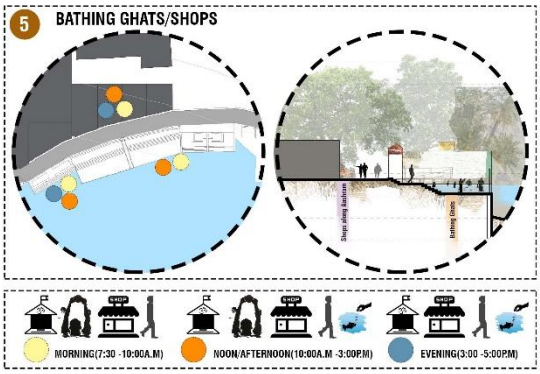


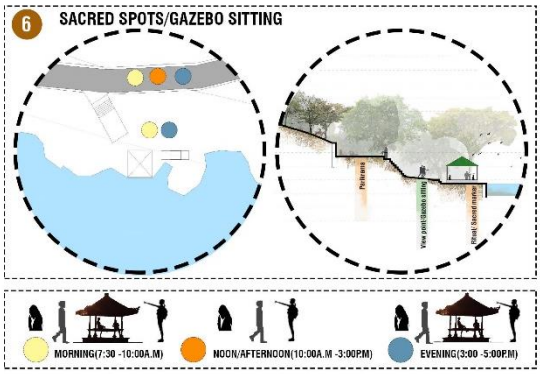


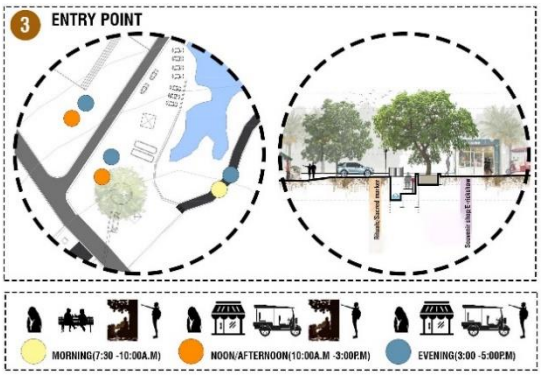
The graph showing the variation in activities at the place with respect to time.

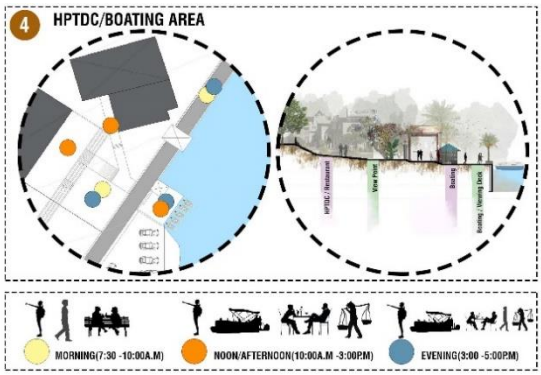

1 PARSHURAM TAL EDGE ALONG WITH PARKING AREA
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)

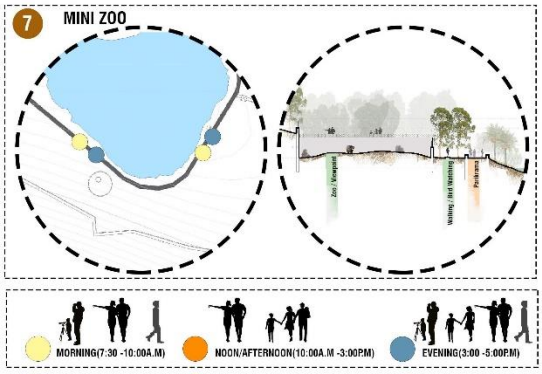

2 RENUKA TEMPLE COMPLEX
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)

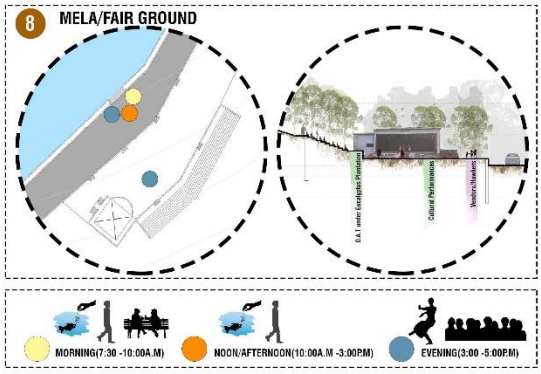

5 BATHING GHATS/SHOPS
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)


6 SACRED SPOTS/GAZEBO SITTING
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)

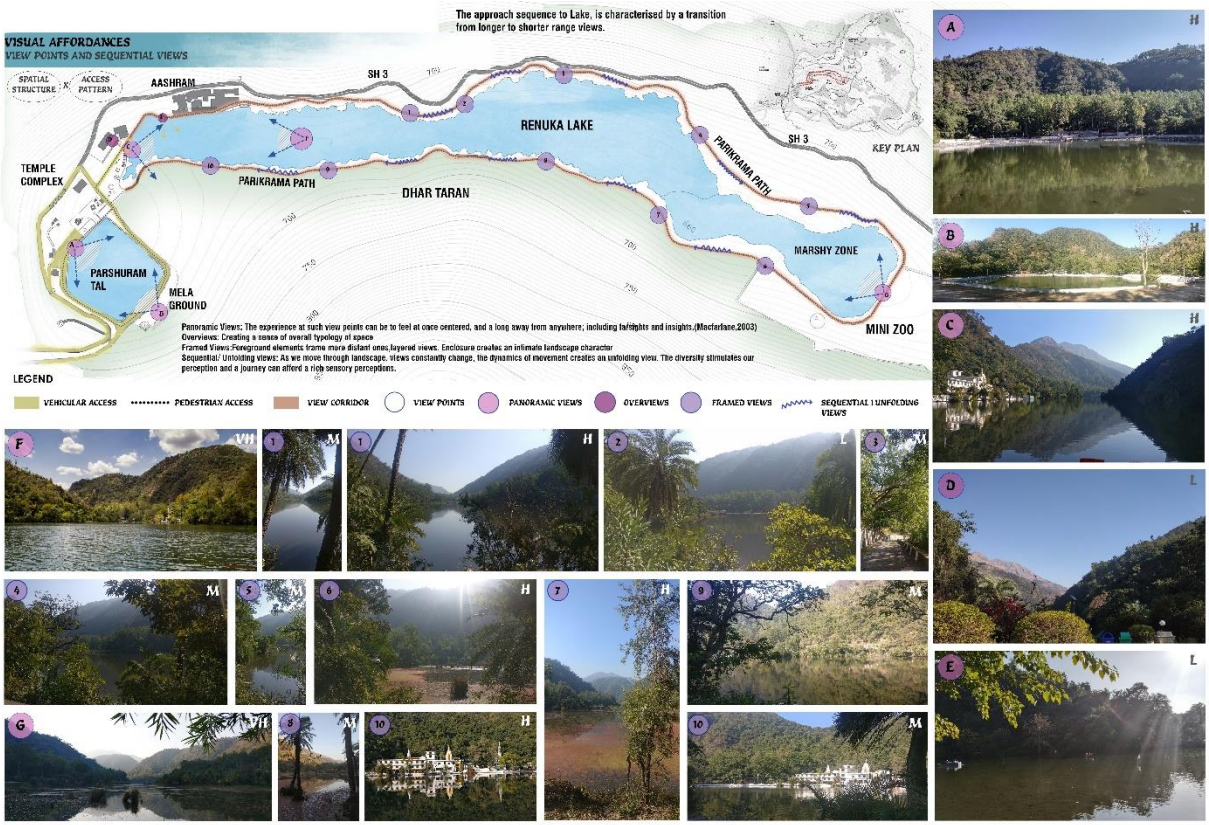

3 ENTRY POINT
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)


4 HPTDC/BOATING AREA
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)


7 MINI ZOO
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)


8 MELA/FAIR GROUND
MORNING(7:30 -10:00A.M)
NOON/AFTERNOON(10:00A.M -3:00P.M)
EVENING(3:00 -5:00P.M)

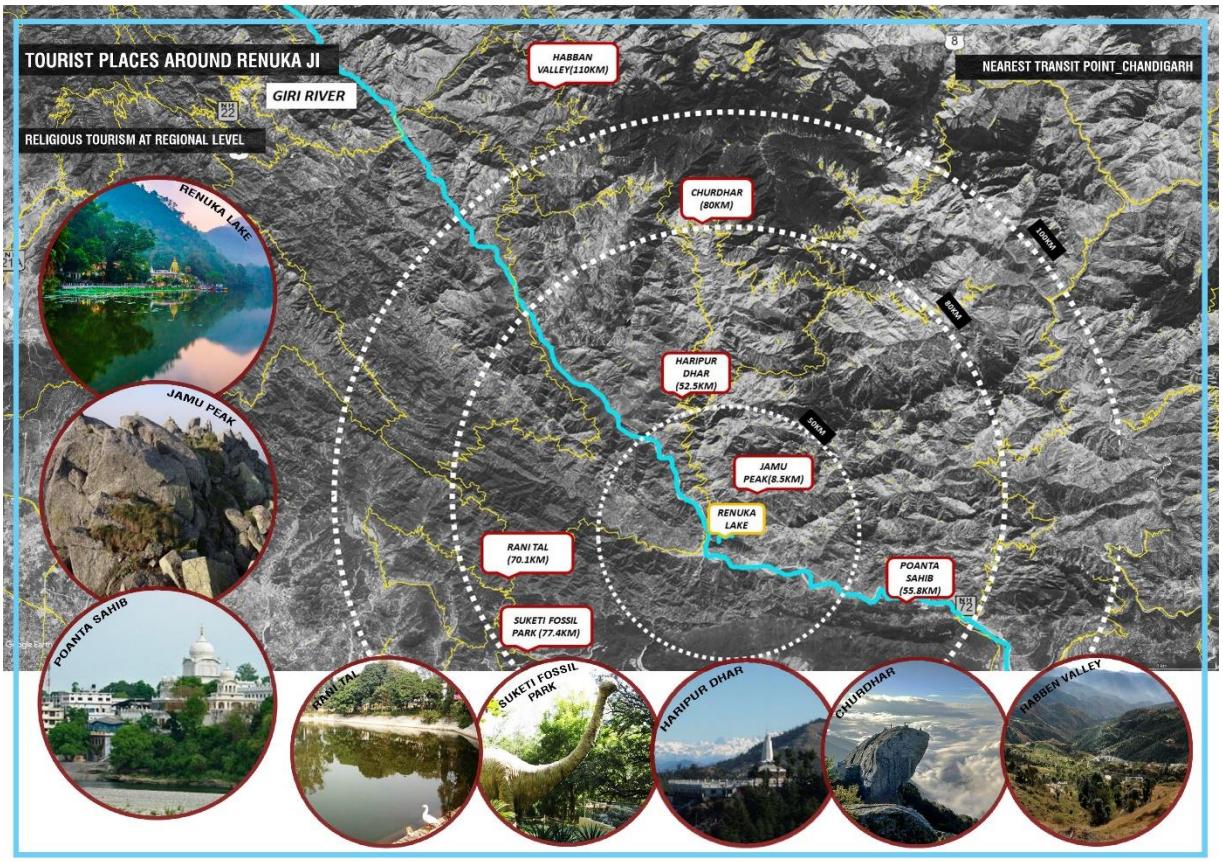
5.5.2 Visual Analysis



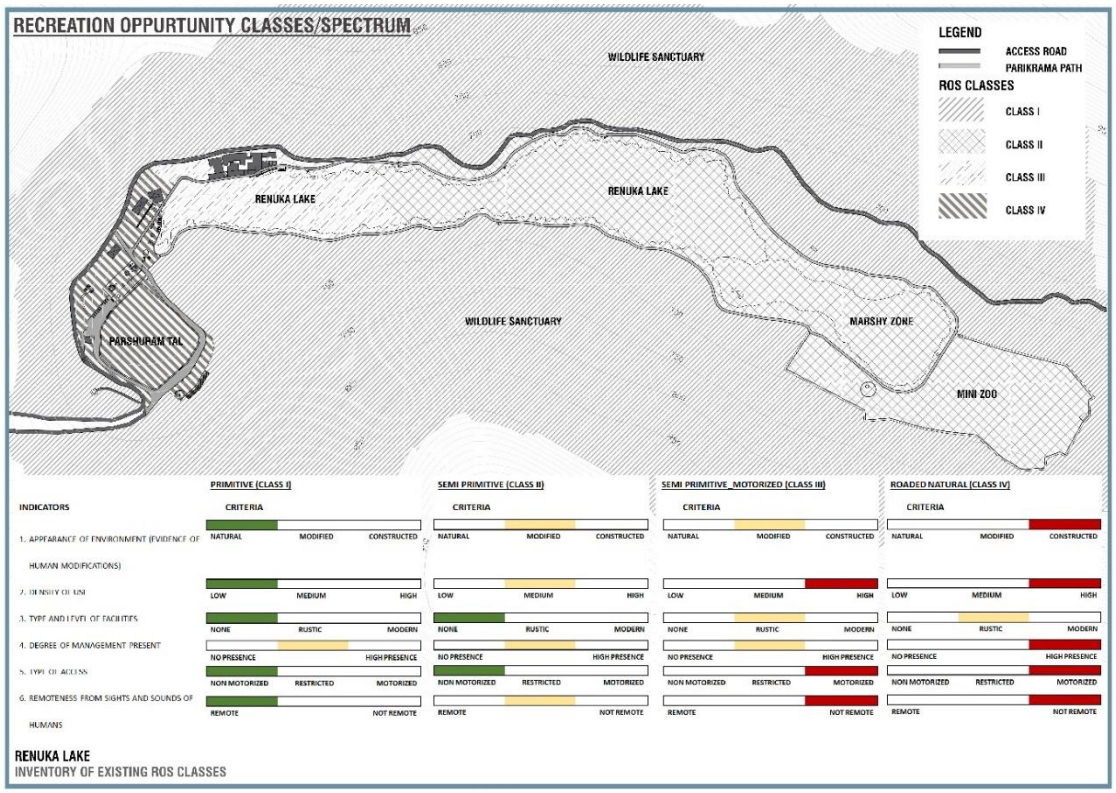
Visual analysis based on spatial structure and access patterns around the lake.

Visitor specific visual analysis through which the strategic locations are carved out for design purposes.

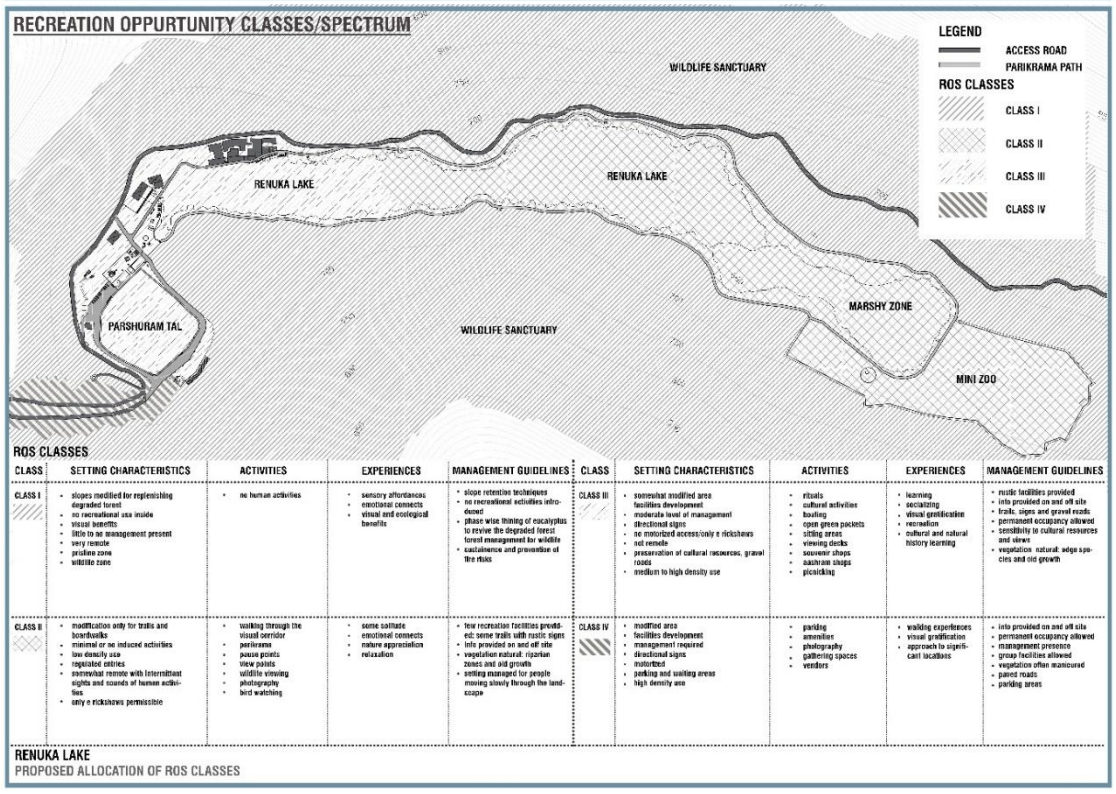
6 DESIGN INTERVENTIONS



Tourist curcuits



RENUKA LAKE
INVENTORY OF EXISTING ROS CLASSES



ROS CLASSES

CLASS	SETTING CHARACTERISTICS	ACTIVITIES	EXPERIENCES	MANAGEMENT GUIDELINES
CLASS I	• slopes meddled for replenishing degraded forest • no recreational use inside • visual benefits • little to no management present • very remote • pristine zone • wildlife zone	• no human activities	• sensory affordances • emotional connects • visual and ecological benefits	• slope retention techniques • no recreational activities introduced • phase wise thining of eucalyptus to revive the degraded forest forest management for wildlife • eucalyptus and prevention of fire risks
CLASS II	• modification only for trails and boardwalks • minimal or no induced activities • low density use • regulated entries • somewhat remote with intermittent sights and sounds of human activities • only e rickshaws permissible	• walking through the visual corridor • peripheral • pause points • view points • wildlife viewing • photography • bird watching	• some solitude • emotional connects • nature appreciation • relaxation	• few recreation facilities provided: some trails with rustic signs • info provided on and off site • vegetation natural: riparian zones and old growth • setting managed for people moving slowly through the landscape

CLASS	SETTING CHARACTERISTICS	ACTIVITIES	EXPERIENCES	MANAGEMENT GUIDELINES
CLASS III	• somewhat modified area • facilities development • moderate level of management • directional signs • no motorized access/only e rickshaws • not remote • preservation of cultural resources, gravel roads • medium to high density use	• rituals • cultural activities • boating • open green pockets • sitting areas • viewing decks • souvenir shops • aashram stays • picnicking	• learning • socializing • visual gratification • recreation • cultural and natural history learning	• nodic facilities provided • info provided on and off site • trails, signs and gravel roads • permanent occupancy allowed • sensitivity to cultural resources and views • vegetation natural: edge species and old growth
CLASS IV	• modified area • facilities development • management required • directional signs • motorized • parking and waiting areas • high density use	• parking • amenities • photography • gathering spaces • vendors	• walking experiences • visual gratification • approach to significant locations	• info provided on and off site • permanent occupancy allowed • management presence • group facilities allowed • vegetation often manicured • paved roads • parking areas

RENUKA LAKE
PROPOSED ALLOCATION OF ROS CLASSES

7 Bibliography

Brijraj.K, D. (2016). Renuka Lake ecosystem and wetland protection, Lesser Himalaya, Himachal Pradesh, India. *ENVIS Center*.

Chand, J. (2017). *Human-Forest interaction in Renuka Forest Division: A Geographical Analysis.* Germany.

Clark, N. (1985). Social categorization, visual cues, and social judgements. *European journal of social pshychology*.

Dudley, N. (2008). Defining protected areas. *IUCN* (p. 220). Spain: IUCN.

Eck, D. L. (1981). India's "Tīrthas": "Crossings" in sacred geography. In D. L. Eck, *History of Religions* (pp. 20 (4): 323-344). Harvard: The University of Chicago Press.

Makhzoumi, Jala; Pungetti, Gloria. (1999). *Ecological Landscape Design and Planning: The Mediterranean Context.* London: E & FN Spon.

Park, C. (2004). Religion and geography. In J. Hinnells, *Companion to the Study of Religion.* London: Routledge.

Tuan, Y. F. (1977). *Space and place: The perspective of experience.* Chicago.

Wallace, Gillian, Russell, Andrew. (2004). Eco-cultural tourism as a means for the sustainable development of culturally marginal and environmentally sensitive regions. *Sage Journals*, vol 4(3) 235–254.

Wishart, D. J. (2004). *Encyclopedia of the Great Plains.* Lincoln: University of Nebraska Press.